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Antimony, Black Needle	Cobalt Sulphate	Molybdenum	Sodium Fluoride
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Barium Carbonate	Cryolite	Nepheline Syenite	Sodium Silicate
Barium Chloride	Dolomite	Nickel Oxide, Gray	Sodium Silico Fluoride
Barium Molybdate	Epsom Salts	Nickel Oxide, Black	Superpax
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Calcium Carbonate	Iron Oxides	Powder Blue	Zircon, Milled
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From the Editor's mail . . .

our faces were red

A clipped article from one of the leading business papers was mailed to us recently. The article referred to the latest developments in the porcelain enameling field, and, as one of the "hot tips" included in the "latest information," there was reference to new enameling steels to be offered by two of the leading sheet steel producers.

Our faces were a bit red on reading this information for it has been our policy to keep in close touch with all developments of this nature relating to materials, products, equipment or processes which might have a bearing on the production of home appliances and allied metal products. We have been following these steel developments for several years and it would have been very disappointing to find that we were asleep at the switch when authentic information was released for publication.

We immediately checked with the two companies referred to and the following is an answer from one of these steel producers:

Gentlemen:

We don't blame you for thinking you had been scooped by a business paper. That's the way it looked on the surface, but actually, you were not.

We have no idea where _____ got the information, and of course if we had known about it they certainly would not have reported it. Rumors fly thick and fast these days; indeed they do.

Because the fact is, our one-coat sheet is *not* in commercial production and we do not know exactly when it will be. We earnestly wish we were in a position to give you a "suitable technical article," but we can't even give you a "news story." Naturally your magazine would be high on our list if we had something to publicize.

This _____ mention embarrassed us no end, but we certainly are not going to embarrass ourselves by re-
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THE finish LINE

THE STEEL SITUATION — is still an important topic of conversation among the producers of home appliances and other metal products. Just as the supply was showing signs of proving adequate to meet essential production needs, strikes brought back the "tight" situation and began again to cause concern to the procurement men responsible for keeping the stock rooms filled.

Last month this page produced evidence pointing to one of the greatest, if not an alltime great, year for production of appliances and allied metal products. The demand is present and the plants are geared to turn out finished products as never before. Steel is again, therefore, the question and the answer to whether or not 1950 is to be the record breaking year that has been prophesied.

The brownout is back

As this is written the Wrigley Building, just across the Chicago River from the **finish** offices, is blacked out as in wartime. Those who visit Chicago know this building as a brilliant white landmark at night, bathed with scores of powerful spotlights. State Street, Chicago's principal shopping street, is already down to fifty per cent of normal light. Within a few days, if the present situation continues, we will all be feeling the curtailment of light and comforts as a result of the coal strike.

We at **finish** always like to feel that our information and news is fresh and up to date. In this instance, however, we would like nothing better than to have this page outdated as a result of settlement of the coal "situation" before the ink is dry on this issue of our publication.

Keep keyed for activity

One thing is certain—the coal strike *will* be settled and industry will again be on its way. To make up for all lost production in steel and finished products may not be possible, but it is a certainty that the metal product plants will be ready to get out every single unit for which steel can be made available.

American industry has taken strikes and set-backs in stride before and will do it again. There is certainly no place or time for the pessimist during 1950. There should be no let-up in aggressive sales activity with strikes or curtailed production as an alibi. Let the salesman do his job, and leave with the P.A. and production men the problems of answering shortages and getting production.

TRENDS IN STEEL FOR APPLIANCES

For many appliances using organic finishes the spotlight has not been focused on "types" of steel to the same extent as for those using porcelain enamel.

Porcelain enamelters are watching two definite and widely divergent trends in finishes and steels, both of which show excellent possibilities.

On the one hand there is the trend to special enameling sheets representing developments far beyond the "enameling iron" or "enameling steel" of pre-war days. This trend is for the use of special sheets for the application of white cover coat enamels direct to the metal base, without a ground coat. **Finish** has been keeping its readers up to date on this trend which now shows at least one company producing complete kitchen ranges in one coat white direct to steel. Many other manufacturers are using the development for some parts and in varying percentages of their total production.

The other important trend is to the use of the so-called "low temperature" enamels applied to ordinary cold rolled steel. The development in this direction during recent years has also been phenomenal and as yet there is no indication that these developments are in any more than their "growing pains" stages.

What to do about it

The significance of these developments to the metal product manufacturer is of sufficient importance to warrant close study, with regard to both production plans and equipment requirements.

The best counsel we could give in connection with the present trends and latest developments is that *any* manufacturer contemplating expansion in production facilities should make a closer study of his requirements than might have been necessary a few years ago.

First, every effort should be made to get *all* of the available information from steel and finish suppliers concerning the latest materials available and their production possibilities for the products to be manufactured.

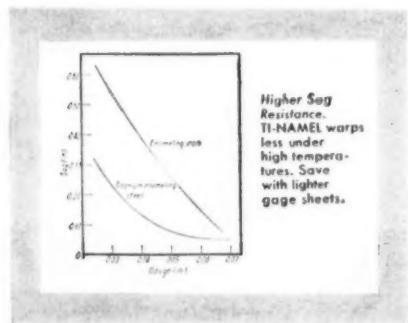
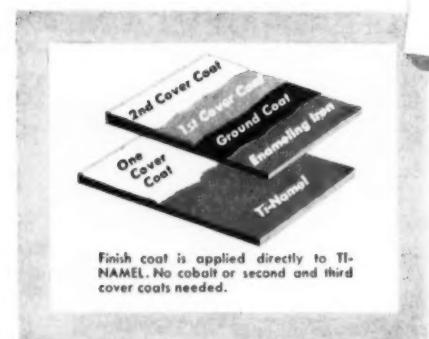
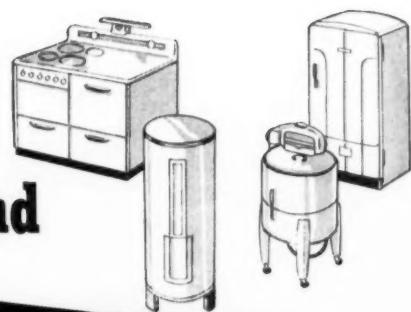
Then, the products themselves should get careful scrutiny to determine what trend in these developments will best fit into the picture, productionwise, costwise, and qualitywise.

The time is past when a specification of "porcelain enamel" on "steel" is sufficient to insure the best results on *all* types of metal products.

After a complete study—then and only then—will you be in position to determine your logical future course, with regard to types of enamels and steels to be used and with regard to future equipment requirements.

Dana Chase
EDITOR AND PUBLISHER

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Packaging for export

—another lesson in appliance protection

a discussion of problems encountered in overseas shipments
and practical measures to effect safe delivery

by *J. Gardner Crowell* • *PACKAGING & CRATING ENGINEER, REFRIGERATOR DIVISION,
PHILCO CORPORATION, PHILADELPHIA*

THE theme of this article may well be expressed in the words of the slogan adopted by the National Safe Transit Committee—"All manufacturing, engineering, and quality efforts are in vain if the product reaches its destination in a damaged condition."

The problem of effecting delivery of a product to destination in good condition in the export field, while basically the same as in the delivery to domestic destinations, is comprised of many hazards and conditions of handling, weather, and other factors not to be found in the usual domestic transit. We will discuss the particular problems that manufacturers encounter in packing for export, and an approach to the solution of these problems.

It is of first importance in planning a program of packing products for export shipment that we understand, at the outset, that fundamentally we must endeavor in the design and specifications to provide a container for each product that will represent the maximum in the way of product protection at a cost consistent with the value of the product.

Different products require different treatment. There frequently is not a too close relationship between the value of a product, and the money that must be spent in packing it to assure its safe arrival at destination.

The packing cost/product value ratio

As an illustration of two extremes in the ratio of packing costs to product value, consider the expense which is involved in packaging cheap glass Christmas tree ornaments for safe

shipment to our shores, as against the packing required to transport a dozen solid gold plates, having a value of many hundreds of times that of the former.

In developing a program for the design, materials, and methods to be employed in packaging for export, a study of the many various conditions of handling to which the shipments will be subjected must be made. Every hazard that may reasonably be anticipated must be given careful consideration. If the export destinations are limited, and the areas in which the product will be sold are few, a thorough analysis may be made of the conditions to be encountered in the complete transits to these few destinations. Whether modern materials handling equipment and methods will be used in the movement, or whether more primitive conditions will prevail, are factors that are to be taken into account.

There has been a rapid and continuous increase in the speed of transportation of all sorts, since the period before the war. 25 miles per hour used to be a good speed for a freight train; today, 50, 60, and 75 miles per hour speeds are common. Shipping companies are pressing for a quicker turn around for cargo vessels. This calls for more rapid loading and unloading by the stevedores, with the consequent danger of careless and rough handling.

If conditions will be favorable to safe transit, it will be possible to utilize less expensive materials and construction without jeopardizing the product, and, also, reduce the cubic footage of the container. When it is borne in mind that the ocean rates

are roughly \$1.00 per cubic foot, the importance of this factor will be realized.

Anticipating unfavorable handling conditions

When, however, the markets for a product are world-wide, and shipments can be expected to be sent to every class of port, the development of the export packing specifications must be predicated on providing materials and design that will be adequate to withstand the unfavorable conditions to be anticipated.

In many ports, lighterage is the only method of transfer from ship to shore, and where these conditions prevail, extremely rough handling is to be anticipated. Therefore, a means must be provided of absorbing the vertical impacts which occur when a winch operator lowers away at the same time that the lighter rises with the sea. Open docks, where no protection from the elements is provided, present a condition hazardous to most

J. GARDNER CROWELL



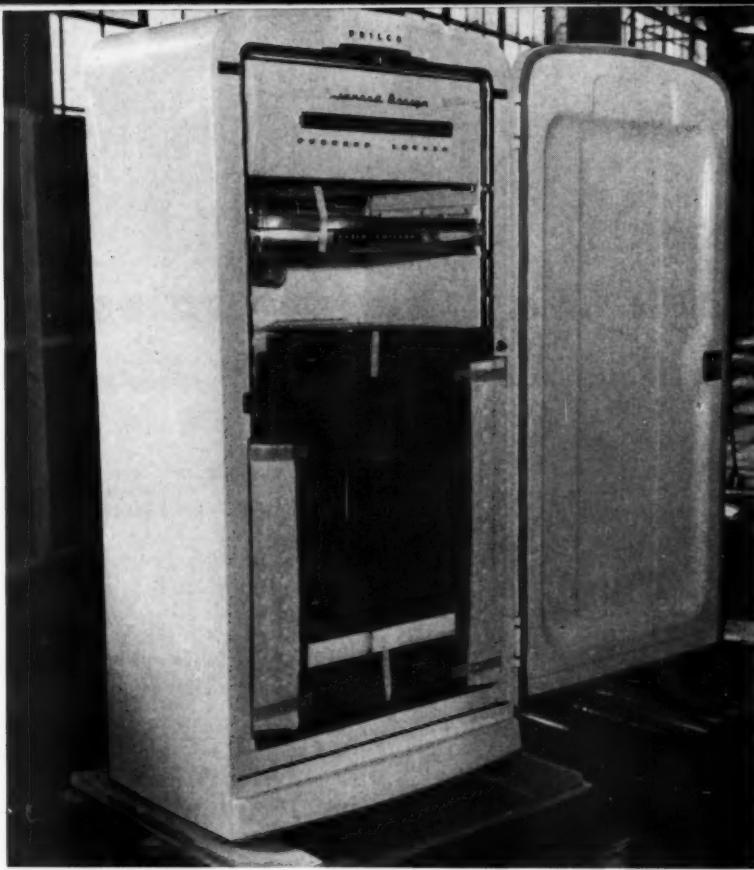


Photo shows method of packing for inside of the refrigerator.

the product are factors of major consideration in the determination of the design and packing materials to be employed in the export container.

In most of these appliances, the single item of greatest weight possibly will be a motor or compressor unit in the operating mechanism. Therefore, both the packing engineer and the product design engineer must work in close cooperation to assure that the method of mounting and securing these heavy components in the assembly of the complete unit is adequate to withstand all conditions of handling to be anticipated during transit.

Frequently, it will be found necessary, in preparing export packing specifications for products containing these heavy component items, to provide special blocking to support them and prevent shifting.

In most appliances, many of the components are of porcelain enamel which is susceptible to cracking and breakage, if not well protected in packing. In an approach to the establishment of the export packing and crating specifications for products of this sort, it is well to begin at the inside and work out. Unless the interior components are well supported and securely fastened and packed to prevent drift, or movement, damage is certain to result.

Packing from the inside out

While a good general policy in packing interior parts and components is to pack them in place, it is often necessary to deviate in this respect in order to effect an inside pack, which will preclude possibility of damage to the interior.

The methods and materials used in making a good pack are quite varied.

Cellulose wadding or felts should be inserted at all points where highly finished surfaces are in contact. Glass parts are a real problem and should be protected by the use of suitable corrugated fibre wrappers and securely positioned to prevent movement. Plastics are coming into great-

products. Very frequently, also, in this type of port, the transportation facilities for the inland haul may be conducive to extremely rough handling.

In formulating specifications for the design and materials to be used to protect a product in shipment to export destinations, past experience is one of the principal guides. Pre-shipping tests also represent an excellent means of proving-out the adequacy of product and packing to withstand the hazards of export shipping.

Packing appliances for export— a major problem

The various products of the appliance industry probably represent the largest and most difficult problem in the whole export packing field. They

not only account for a very large part of the dollar volume of the sales of American exporters, but, unfortunately, have also accounted for a very high percentage of the damage loss in foreign shipments. The packing of these products represent, I believe, the greatest challenge to the packing profession.

One of the questions to be resolved in the development of the design and materials to be employed in packing and crating a product for export is that of whether the product, of itself, will offer resistance to compression and impact, and, hence, require a type of container that can be dependent to some degree on the product for stability and strength of the combined package, or whether the product is of a nature that will require a crate or container that will furnish resistance to impact and compression independent of the product. We know that most appliances are in the latter category.

The size, weight, center of gravity, and the materials and construction of

A wadding blanket is placed between cabinet top and filler pads.



er favor for the fabrication of trays, pans, partitions, and other interior parts. Some of these plastics are made of the high impact materials, but others are of a more fragile construction and particular care must be exercised in the methods of packing the items fabricated of these materials.

Many light parts can be securely held in place with pressure sensitive tapes. The selection of these tapes, whether of cloth, fibre, or paper backed, should be based, first, on the strength required, and, secondly, on the ease of application. It must be determined whether the application is such that constant vibration in transit might impair the original adhesion.

Light metal parts such as shelves, or partitions, can be held securely in place by means of spring clips, twisted wire fasteners, or by tying with fabric tape. However, the value of this latter means is dependent on the degree of tautness attained by the operator and the tightness of the knot used, both factors subject to much variance.

Items that are heavy should be positioned so that the weight of these is distributed as evenly as possible, and must be firmly locked and fastened in place to prevent any shift or movement in handling.

After the packing to be specified for the interior has been determined upon, the type of exterior crate or container and method of mounting the product therein is to be considered. The clearances necessary to prevent pressures from the outside of the crate or container from being transmitted to the product must be established. The amount of clearance will be dependent on the kind of materials employed in the construction of the exterior crate, and whether the product is to be rigidly mounted in the container, or a floating type of pack is to be used. The clearances must be adequate to prevent contact under severe impact, or pressures, that will be encountered in export

Close-up view of rubber cushioning pads used on the bottom corners.

shipments; yet, it is important that conservation of cubic area be not forgotten. Each inch of clearance over an area of only 3' x 4' represents a cubic foot, or about one dollar in ocean freight costs.

Packing the refrigerator for export

One of the best examples of a product that requires full protection against contact, impact, and torsion, is a refrigerator. A description of the materials and methods used to pack them for export will illustrate in a practical manner the development of an export pack for a product of this character. Both the interiors and exteriors of a refrigerator have highly finished surfaces. Many rather fragile materials are used in their construction. Glass, plastics, and porcelain, which is glass fused to steel sheets, are some of these.

Doors, or lids, can best be firmly held in place by the use of a flat steel strapping. To prevent the strapping



from marring the surface finish, a cellulose wadding pad should be used beneath the steel band. A pre-assembled combined band and padding strip is now available and this affords a simpler method of applying the band and cushioning strip. There will be many instances where the use of some of the stronger pressure sensitive tapes will be adequate to fasten hinged components such as doors, lids, or covers. It must be ascertained, however, that extreme conditions of temperature and humidity will not break-down the tape.

Care also must be exercised to assure that the adhesive material of the tape will not stain the finish of the particular product, and that the

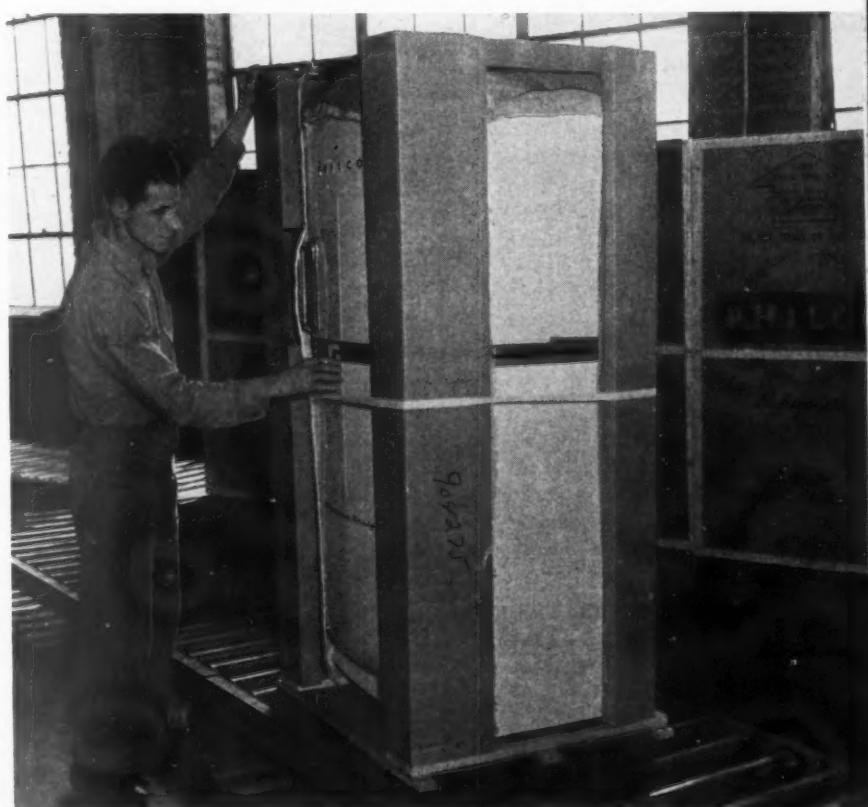
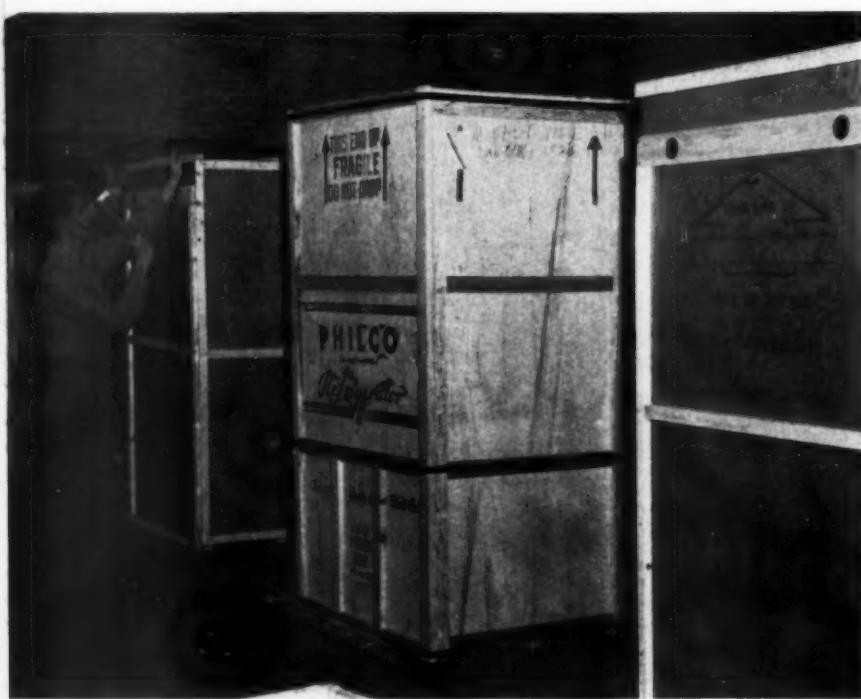


Photo shows use of full length pads of built-up corrugated material.



A fully crated and banded export job is shown on line with domestic jobs.

and are designed to conform to the contour of the cabinet.

The pads are full length, running from top to bottom with wide flanges to provide broad bearing surfaces along the front, sides, and back of the cabinet. Cut-outs are made for hinges and door handles, and other protruding parts such as the plate condenser at the rear.

Cellulose wadding of 20-ply thickness with kraft paper backing is used between the built-up corrugated pads and the finished surface of the cabinet to afford protection to the finish and also cushion against impact. The wadding is glued to the corrugated pads with a vegetable glue applied to the kraft backing of the wadding.

At the top of the cabinet, two wedge shaped fillers of double wall corrugated board are used. These scored and folded sheets provide three thicknesses of double wall corrugated cushioning as protection for the top of the cabinet and conform roughly to the curvature at this point.

A cellulose wadding blanket, also of 20-ply thickness, is placed over the entire top of the cabinet between the filler pads and the finished surface of the cabinet.

A minimum of $1\frac{1}{2}$ " clearance at front, sides, and back is specified to prevent any possible pressure against the outer surface of the crate from reaching the cabinet itself.

Export crate construction

A fully cleated plywood veneer crate of $3/12$ —that is $1/4$ " thick plywood—is used. Two intermediate horizontal cleats are specified for all panels so that there is but a limited span between cleats in the areas of the panels. In addition, two vertical trucking cleats are employed on the front and back panels to afford protection against the sharp edges of the lips of hand trucks. These extend upward from the bottom horizontal cleats to the first of the intermediates.

The cleats are of 1×2 lumber, dressed to $7/8 \times 1\frac{1}{8}$. Group I or II
to Page 74 →

tape has no objectionable odor. This should be established by tests of the proposed application under the most rigorous temperature and moisture conditions to be anticipated in overseas transits.

From rigid to semi-floating method of mounting

Prior to the war, our refrigerators for export were packed using a rather rigid method of mounting them in the shipping crate. This consisted of bolting the cabinets tightly to the crate base at the bottom, and also to a rigid boom across the upper part of the rear of the crate. While this had proved fairly satisfactory under conditions existing at that time, the damage experienced in early post war shipments indicated the need for improvement and the semi-floating method of mounting the refrigerator in the crate was developed.

A means of absorbing both vertical and horizontal impacts to prevent these blows from being transmitted with such force as to cause distortion or damage to the cabinet was necessary.

The use of rubber cushioning pads at the bottom of each of the four corners was specified as the principal medium of shock absorption. These

pads are $3/8$ " thick natural rubber, of 35 to 40 durometer.

The base of the refrigerator was mounted to the crate base by means of machine screws. The diameter of the holes in the base, for these screws, was made wide enough to allow considerable lateral movement of the cabinet under impact. The friction of the rubber corner pads serves to retard the velocity of shift in the horizontal plane. In addition to the four base cushioning pads, a rubber washer was employed between a steel washer under the head of the screw, and another rubber washer placed between the outside of the cabinet and the crate base. Thus, an additional means was provided of absorbing the initial vertical impact and also the rebound, a sort of double action shock absorber.

In the semi-floating type of pack, the bottom panel of the export shipping crate is designed to serve as both the crate base and the skid for the refrigerator cabinet.

Exterior "shock protection"

To provide cushion against lateral shock, large jumbo pads of built-up corrugated material are used at each of the four corners. These are a modification of the Agar-type of pad,

The significance of water in industrial processes

acceptable drinking water may not be satisfactory for industrial uses;
water treatment methods explained in relation to porcelain enameling

by F. H. Kahler and J. F. Wantz •

ILLINOIS WATER TREATMENT CO.,
ROCKFORD, ILL.

WATER is supplied to all municipalities for drinking and sanitary purposes and assurance is given that it is safe. Although such water may be safe and pure enough to drink, it may not be pure enough to do a good job in a manufacturing process.

Two sources of water

The sources of water may be divided into two general classes—ground waters and surface waters. The first of these is obtained from either deep or shallow wells. Ground waters contain appreciable amounts of mineral solids which they have dissolved from the soil, rock or sand thru which they have filtered to reach the underground streams but are usually free of suspended matter. Surface waters contain mineral solids which they have dissolved from the soil over which they have run and in addition may contain organic matter from vegetable growth or suspended matter such as sand or silt. In municipal supplies the suspended matter is usually removed by filtration before distribution.

Ground water from deep wells is normally quite constant in its content of dissolved minerals as the path of flow of the water to the underground stream is practically constant and unaffected by surface conditions. Water from shallow wells will vary somewhat as the underground levels near the surface are affected by variations in rainfall and other conditions.

Surface waters, which may come from rivers, lakes, reservoirs, etc., vary widely in their composition. The

quantity of dissolved minerals is dependent upon the amount of rainfall, the portion of the watershed in which rain occurs, the velocity of a stream and contamination by industrial wastes.

As indicated, all water supplies contain dissolved mineral solids. Although the amount may vary from one source to another or in a single source from time to time, in general all supplies contain the same types of impurities, the major portion of which are mineral salts.

For many uses, the impurities in the water supply cause no difficulty and are no disadvantage. For other uses, however, it is frequently found that certain characteristics of water are detrimental. Probably the commonest impurity which causes trouble in water supplies is hardness. When a water supply is said to be "hard" among other things excessive amounts of soap are required for any cleaning action.

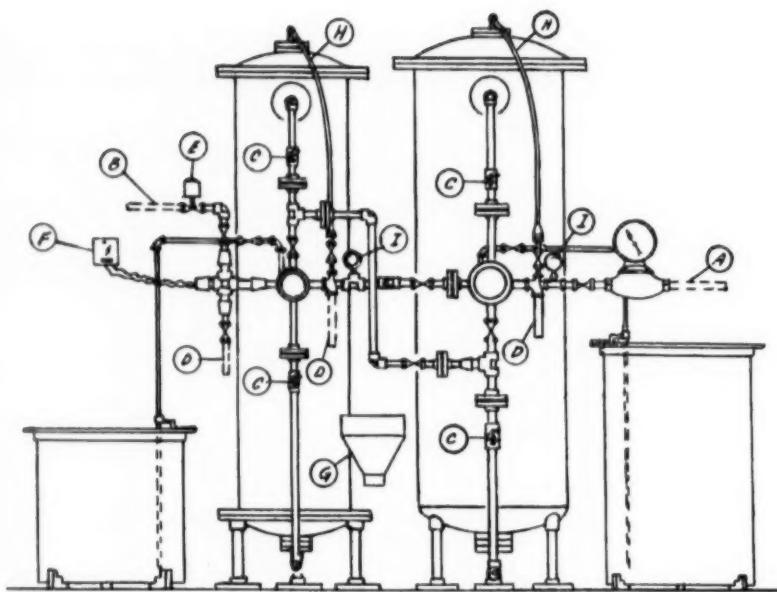
Characteristics of "electrolytes"

Since pure water is not hard, this characteristic must be due to some material dissolved in the water. Early studies on water solutions showed that certain materials acted differently from others. Water solutions of these materials, which included acids, bases and salts, would, among other things, conduct an electric current and these materials came to be called "electrolytes". It is believed that when electrolytes are dissolved in water, they separate into parts. This separation into parts is called ionization and the particles into which the salt

separates are called ions, each of which is electrically charged. There are many further ramifications to this phenomenon but here we will consider only one—namely, the fact that each ion bears an electrical charge. It has been found that there is a unit of this charge and that each ion bears a whole number multiple of this charge—either positive or negative. Those ions bearing a positive charge are called cations and those bearing a negative charge are called anions. In any solution it must always be true that the total of the positive charges must equal the total of the negative charges. It is for this reason that formulas are written as they are—e.g. CaCl_2 , Na_2S .

In water the salts ionize and regardless of the nature of the original salt, there are calcium or magnesium ions present and the water is hard due to the calcium and magnesium ions. Obviously, the hardness could be removed if the calcium and magnesium ions could be eliminated. But the total number of positive charges must be equal to the total number of negative charges so it is impossible to remove the calcium and magnesium without removing an equivalent number of anions or adding an equivalent number of some other cation.

Early studies of natural occurring sands called "glaucophane" showed that they could be used to remove the hardness from water. When a hard water was allowed to come in contact with these insoluble materials, the calcium and magnesium were removed from the water and replaced by



Legend for Diagram of Deionizing Equipment

- A — Raw water inlet
- B — Treated water outlet
- C — Sample cock
- D — Outlet to drain
- E — Motorized valve
- F — Solenoid bridge controller
- G — Drain funnel
- H — Vent line
- I — Pressure gauge

sodium. In other words, these materials, although insoluble, exhibit a form of ionization and have available an excess of sodium ions which they will give up in exchange for calcium and magnesium.

The ion exchange phenomenon

This was the first recognition of the phenomenon of ion exchange and offered a means for removing objectionable hardness from water. After a period of time, the material will run out of sodium and become loaded with calcium and magnesium. When this occurs no further ion exchange takes place, the water is no longer softened and the material is said to be exhausted. To replenish the supply of sodium ions, the material is regenerated by passing a solution of common salt or sodium chloride thru the material. The great excess of sodium present in the salt solution crowds the calcium and magnesium from the material and again saturates it with sodium making it again able to soften water. Later work led to the development of synthetic zeolites and the synthetic resins, which also show ion exchange. These materials have a much greater capacity per unit volume for softening than the original greensands as well as other physical advantages.

Hard water is particularly significant to the porcelain enameler because the metal is always cleaned

prior to enameling and the cleaning process uses a detergent or soap. The effect of hardness in water on soap is well known and is often shown by the familiar bath tub ring. When soap is added to hard water, immediately a precipitate forms from the soap and the calcium and magnesium ions and the soap so precipitated is lost as far as cleaning action is concerned. This necessitates the use of sufficient cleaning agent to precipitate and remove all the hardness present in addition to that required for cleaning.

In a water containing ten grains per gallon of hardness there will be one thousand grains of hardness in one hundred gallons of water. A typical soap is sodium stearate and if this is added to hard water, six times as much soap will be precipitated as there is hardness present. In this case, one hundred gallons of water containing ten grains per gallon of hardness will use six thousand grains of soap to precipitate the hardness. Remembering that seven thousand grains is equal to one pound, the loss in cleaning agent is evident.

In addition to savings in cleaning agent, there are other gains from the use of soft water in the cleaning room. If hard water is used, the precipitate formed by the hardness and soap tends to cling to the work and longer treatment is required in the later cleaning operations. Even with long cleaning, traces of the pre-

cipitate may cling to the work and cause rejects in the finished work.

As mentioned earlier, in softening, the calcium and magnesium are replaced by sodium by "ion-exchange". Further studies of the ion-exchange materials showed that if instead of salt, an acid was used to regenerate, not only was the hardness removed, but also all other metallic cations and they were all exchanged for hydrogen. This exchange resulted in the formation of acids from the mineral salts originally present. Soon after this development, other types of resins were made which would adsorb or exchange the anions, making complete deionization possible.

Producing a "treated water"

Passing a water supply successively thru a good cation exchanger and acid adsorber will produce a "treated water" containing ten ppm or less of dissolved minerals, exclusive of silica which may be present in the raw water. Such deionized water will be comparable in purity to ordinary distilled water. In some special cases, very high purity is required in the treated water and in such cases the water may be passed thru four resin beds—cation exchanger, acid adsorber, cation exchanger, acid adsorber. This amounts to double deionization and will produce a water of higher purity. However, it requires a greater initial investment and means a higher operating cost than single deionization. The advantage of the second deionizing step may be compared to the advantage gained by double distillation. Double distilled water is of higher purity than single distilled but the additional cost is seldom justified.

In operation the resins are usually

housed in pressure vessels which are either constructed of corrosion resistant material or of steel which is lined with a corrosion resistant material. External piping and valves, which are both of corrosion resistant material, are arranged to permit the proper service flow and regeneration steps. To assure uniform distribution of the water over the resin beds, there are internal piping systems to spread the water over the resin beds and the resins themselves are supported on beds of graded quartz or anthracite. Finally, regenerant containers and control instruments are included.

During the service cycle, a deionizer requires no attention. Treated water is drawn from the service lines as needed at a pressure only slightly less than that of the raw water. After a certain amount of water has been deionized the equipment must be re-

generated. First the resin beds are backwashed to remove any materials from the top of the resin bed and to reclassify the resin; second, the regenerant solutions are drawn into the resins; and third, the excess regenerant is rinsed out. All steps of regeneration are controlled by means of a multiport single control valve. After rinsing until the required purity is reached, the unit is returned to service and requires no further attention until regeneration is required again.

The water produced by deionizing equipment will contain from four to eight ppm of ionizable material or approximately the same as distilled water. That distilled water is advantageous in the mill room has been reported but its cost has always made its use prohibitive.

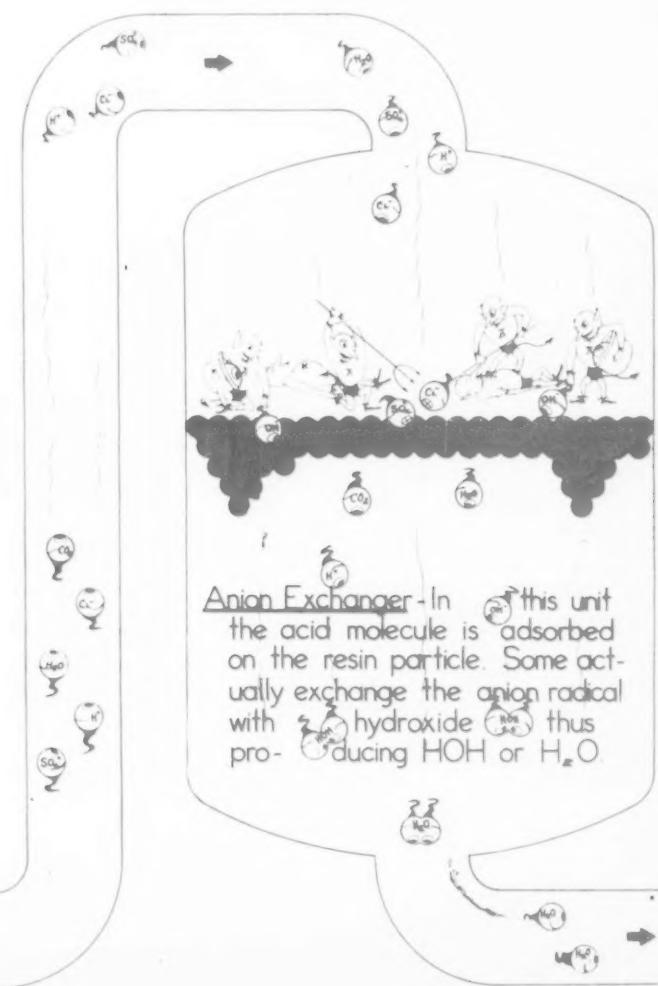
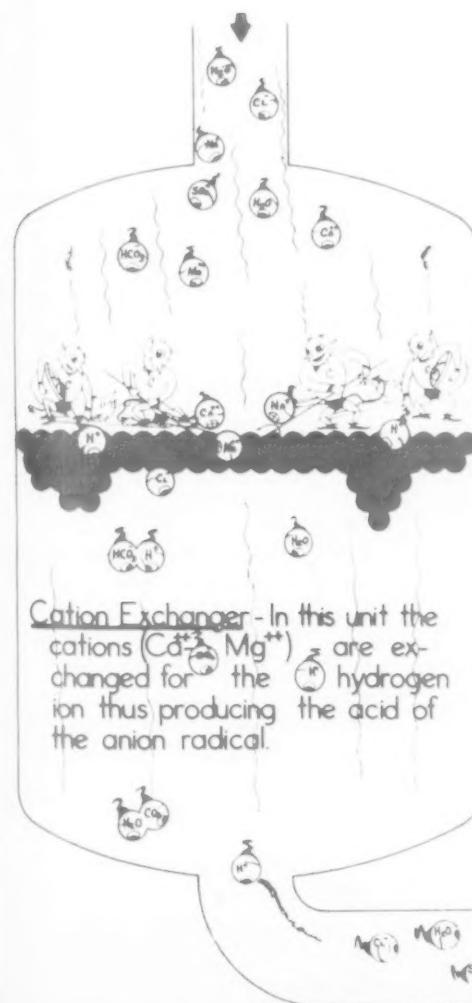
As pointed out earlier, all water supplies contain dissolved solids. It

is true that adjustments can be made in the mill room for the solids but unfortunately, about the time the proper adjustment is made, the water supply changes, necessitating further adjustments. The use of deionized water assures a water of the same composition in spite of variations in the raw water. Once the proper formula is established it can be used with full confidence that the results will not be changed in a short time because of a changing water supply.

Effect of variation in water supply

The effect of variation in a water supply can be well demonstrated by results obtained by one enameler. An enamel was milled in a 300 gallon mill in such a mixture that it was putty-like and would stand in a ball. To this was added only three cubic

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Electrical measurements on metal protective paints

by W. E. Shaw and D. L. Hawke • RESEARCH LABORATORIES, NATIONAL LEAD COMPANY, BROOKLYN, N. Y.

MUCH evidence of interest has been shown in the possibility of using electrical measurements for evaluating metal protective paints.

The measurements used for this purpose have been those of bulk potential, resistance, and capacitance or dielectric constant. It will be the

purpose of this article to discuss these three types of measurements as related to metal protective paints on steel presenting some data, describing the experimental set-up for the measurement and offering an explanation of the sources of certain of the phenomena being measured.

The determination of the onset and extent of corrosion underneath a paint film rapidly and non-destructively has long been a desire of the laboratory corrosion worker. Visual examination of the steel surface after stripping away the paint film has been the only satisfactory means of determining the degree of rusting that has occurred. This technique is unsatisfactory, for when a film is stripped further testing on that panel cannot proceed. A different panel must be examined to obtain an idea of the rate at which corrosion is progressing. This necessitates the use of a vast number of panels to establish statistically the manner and rate of corrosion.

Considering the available knowledge of the mechanism of corrosion, there should be some means of evaluating the degree and rate at which corrosion is proceeding without destroying that which we are examining. Since corrosion is an electrochemical process, the obvious logical means of making these measurements are those of an electrical nature. Much success has been obtained in following the corrosion of bare metals with electrical tools. The work of Gatty and Spooner⁽¹⁾ may be cited as evidence of work of this type. Many other works could be cited where bulk potentials have been used to show trends toward active or passive states and indicate what the probable rate of corrosion is.

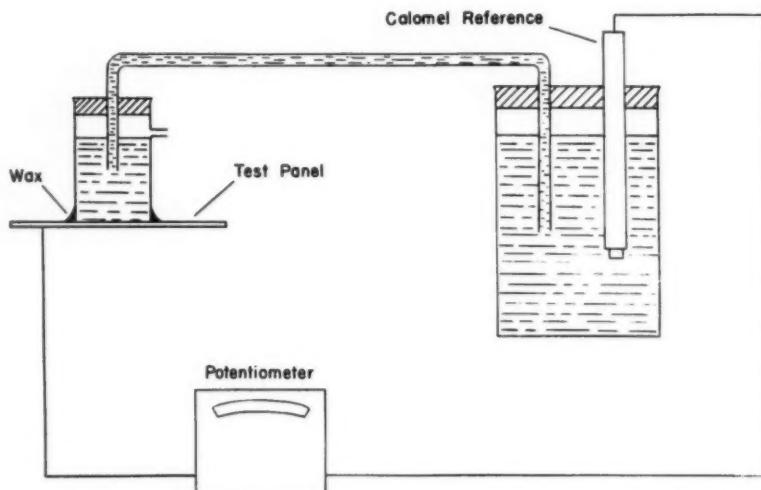
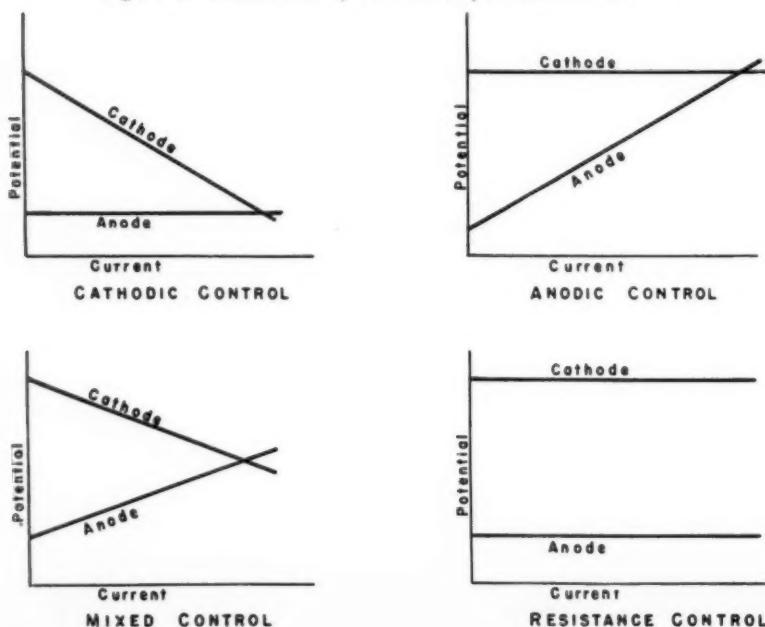


Figure 1. Arrangement of experimental equipment for time potential.

Figure 2. Illustration of theoretical polarization curves.



The measurement of bulk potentials and their change with time is also applicable to painted steel surfaces. The equipment necessary for this type measurement consists of a vacuum tube potentiometer and a reference half cell. A suitable experimental set-up is shown in Figure 1.

The experimental set-up is one regularly used in these laboratories. The painted steel to be tested is waxed to a glass cylinder containing the corrosive medium. This medium is connected by means of a solution bridge to the reference half cell. The two half cells which constitute the battery being measured are connected to a vacuum tube potentiometer.

The potentiometer used for this measurement is rather specialized. Inasmuch as the two half cells which constitute the battery are weak, and have a high internal resistance, the potentiometer must be able to feel this small voltage through a high resistance and withdraw only a minute amount of current. For, depending on the degree of corrosion or activity of the steel-paint half cell, a small withdrawal of current may radically change the observed potential. A satisfactory type of potentiometer is one employing a type RH 507 or similar electrometer tube.

Basic source of potential

To understand better the meanings of the potentials being obtained, an examination as to the sources may be worthwhile. The basic source of the potential is the fact that the change of free energy from the metal to the corrosion product is negative. However, the magnitude of the potential and the corrosion rate or current that is occasioned by it is of importance. If anode or cathode polarization curves are obtained for steel, four general curves result. They are the anodic control, cathodic control, mixed control, and resistance control and are illustrated in Figure 2.

An excellent discussion of these curves and their application is given in a paper by R. B. Mears⁽⁴⁾. The shape of the curves is dependent on the metal and the electrolyte. The slope of the anode curve depends on the area of the anode; likewise, the

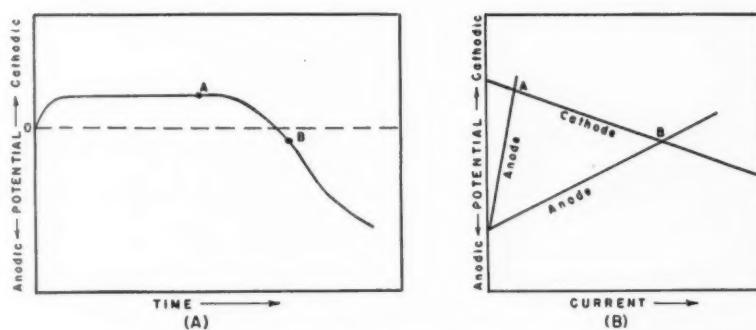
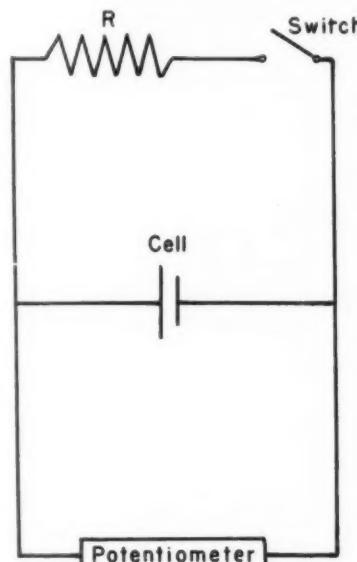


Figure 3. Polarization explanation of time potential curves.

slope of the cathode curve depends on the area of the cathode. Thus, if with time the active anode or cathode increases or diminishes in size, rotation of the polarization curve will occur. Translation of these curves can be caused by changes in the electrolyte. These facts are important because they show what the bulk potential of the specimen under test will be. Considering the specimen at

any fixed moment, the areas of cathode and anode and, correspondingly, the slopes will be fixed. For a definite current value (I) or corrosion rate, there will be a potential difference (ΔE) between anode and cathode. If each separate area of the metal under examination is considered as a local element, the resistance (R) between local elements is obviously $\Delta E/I$; R is the total resistance



$$R_0 = R_s \left(\frac{E_0}{E_s} - 1 \right)$$

R_0 = Resistance of cell in ohms

R_s = Resistance of shunt in ohms

E_0 = Voltage of unshunted cell

E_s = Voltage of shunted cell

Figure 4. Internal resistance of a battery using shunt.

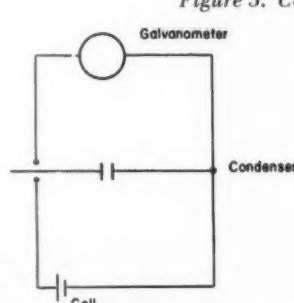


Figure 5. Cell resistance using a condenser.

$$R = \frac{t}{2303 C \log \frac{d_s}{d_s - d'}}$$

R = Resistance of cell in ohms

t = Time in seconds

C = Capacitance of cell in farads

d_s = Deflection of cell with no resistance equal to CE/K where

E = cell voltage

K = galvanometer constant, coulombs/mm

d' = Deflection of galvanometer resulting from charge in condenser

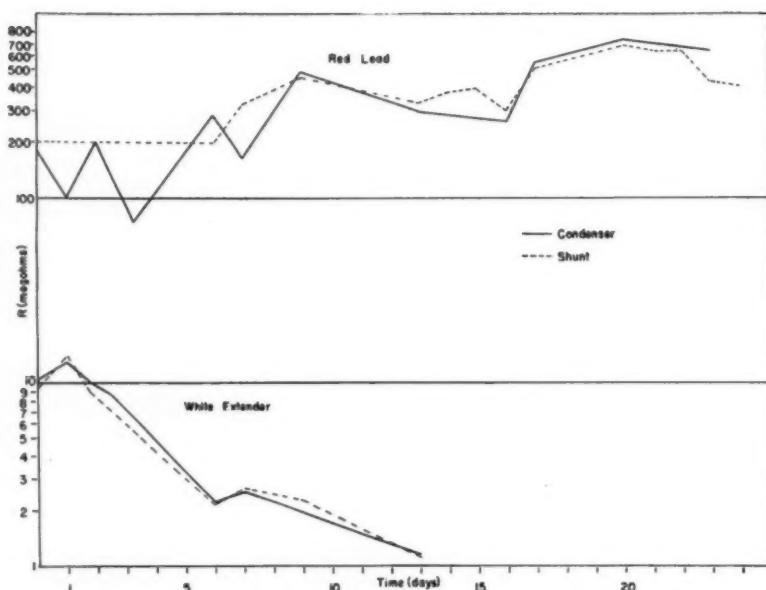


Figure 6. Resistance of red lead and white extender paints by shunt and condenser methods.

and is the sum of the metallic resistance and the electrolyte resistance. If the local elements are contiguous, R approaches zero, ΔE approaches zero and I and E become single valued determined by the intersection of the anode and cathode polarization curve. Thus, the bulk potential of a metal is fixed by the intersection of these polarization curves. As regards the change in E , it follows that a change in slope of the anode or cathode polarization curve will result in a new point of intersection and consequently a change in bulk potential. An increase in current

representing an increase in corrosion rate could be indicated by either an increase or decrease in bulk potential.

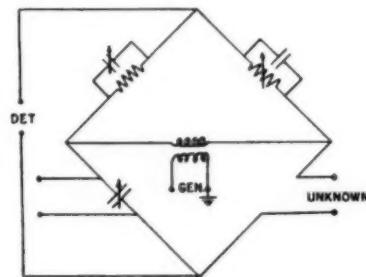
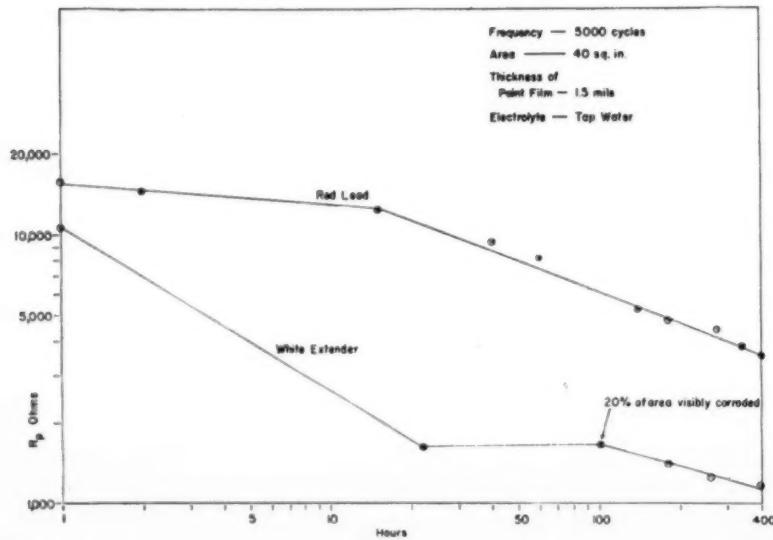


Figure 7. AC bridge for measuring cell resistance.

Figure 8. AC resistance (R_p) of red lead and white extender.



tential. Fortunately, in most cases we have encountered under paint films, the electrolyte, whatever its composition, yields a polarization curve of the mixed anodic controlled type and an increase of corrosion current causes a shift in potential toward the negative. A theoretical illustration of this is shown in Figure 3A and 3B.

At the inception of a time-potential test, if the steel specimen is completely passive, other existing half cell potentials will be measured. Various possibilities that exist with a painted steel surface are membrane potentials, oxidation reduction potentials caused by soluble portion of pigment, and conjugate oxidation reduction potentials originating from organic vehicle constituents. Initial potentials obtained on painted passive steel reflect these extraneous potentials. When the activity of the steel half cell increases, these aforementioned potentials are probably of negligible effect.

With time, a point marked A in Figure 3A is reached. At this point, the potential observed is indicated in the polarization curve 3B by the point A. With further exposure, a different bulk potential B is obtained which is indicated in 3A and 3B. It will be observed that the transition in potential from A to B is accompanied by a large transition in the corrosion current (or rate).

The time-potential test

A discussion of the practical conduction of a time-potential test on painted steel has been published by H. E. Zahn⁽⁶⁾. The theoretical aspects and possible interpretation are well covered by R. M. Burns and A. E. Schuh⁽²⁾. With proper performance and interpretation, this test can indicate the onset of rapid corrosion and help clarify one of the mechanisms whereby a pigment protects a metal. This will assist in determining the merit of a metal protective paint.

Another approach to corrosion studies of painted steel by electrical techniques, one which has received considerable attention, consists of measurement of the change of electrical resistance of painted steel ex-

posed to a corrosive environment. The determination of this resistance change can be of value in two ways:

(1) An estimation is obtained of the time required for penetration of a corrosive environment through the film to the base metal. Although no paint film under water can be expected to completely exclude moisture for long, a general indication of the mechanical barrier properties of the paint may be furnished. Though a high water resistance alone does not guarantee a good metal protective paint, the embodiment of this quality with the inhibitive action of an effective pigment is always desirable.

(2) After the penetration of a corrosive medium to the base steel, subsequent reactions resulting in the formation of polarizing films at the metal-paint interface can be followed to some extent by proper measurement and interpretation of changes in resistance.

Direct current measurements of film resistance are, in the case of wetted films on steel, unreliable because of polarization obtained with current passage. When the corroding metal is used as a half cell in conjunction with a reference cell, or a battery is used, the measurements, indicated as resistance, show the current delivering capacity of the cell on test or equivalently the polarizability of the two half cells. In the "Internal resistance of a battery" type measurement, such as that used by Bacon⁽¹⁾, et al, whose circuit is shown in Figure 4, a cell which can only deliver a few coulombs, will show a great change in E.M.F. when shunted. This would correspond to a high resistance indicative of a good cell—which it is. An inferior protective paint would allow a larger current to be withdrawn because of the greater current delivering capacity of the actively corroding cell and not alter materially the shunted E.M.F. This would, in turn, indicate a low resistance or a bad film. The point is, however, that resistance is not being measured. Current capacity, or activity, or polarizability actually is being measured and the measurement can hurt the film.

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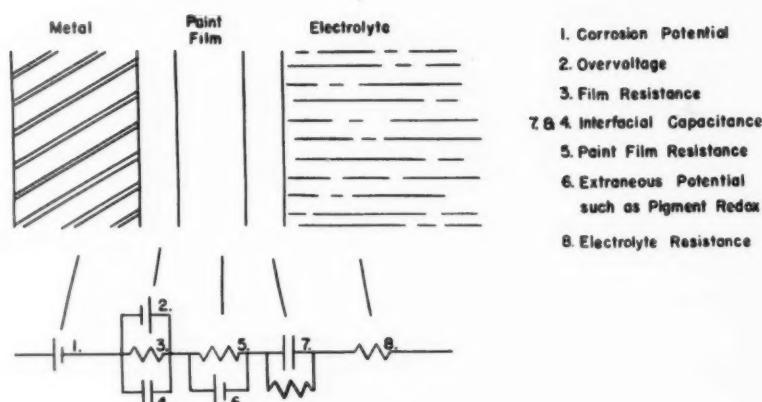


Figure 9. Electrical analog of painted steel.

Figure 10. Results of corrosion by capacitance.

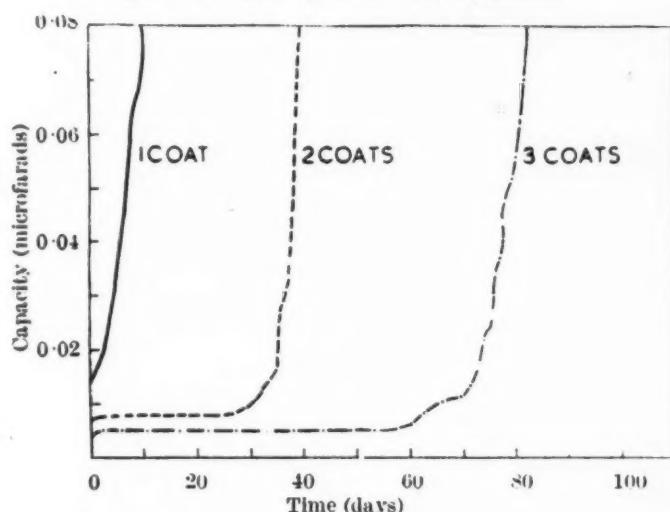
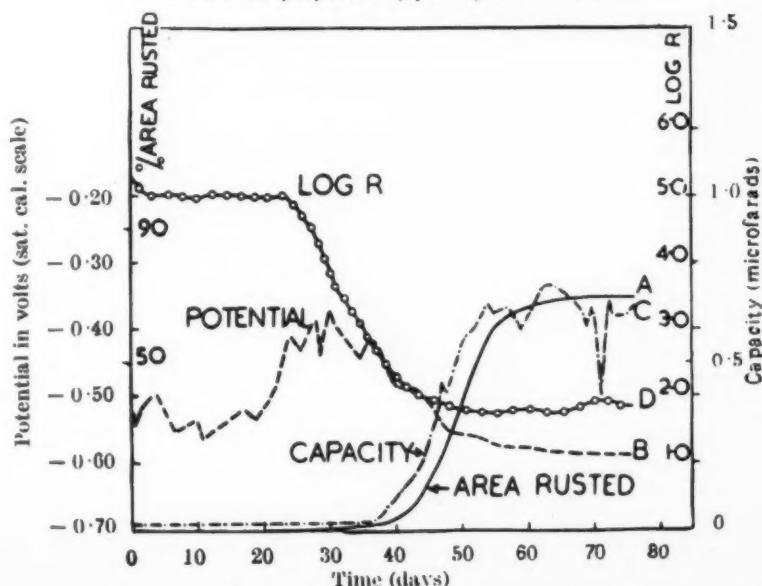


Figure 11. Relationship between area rusted and changes in electrical properties of paint films on steel.





Vancouver installation emphasizes versatility of architectural porcelain

ON a prominent corner in downtown Vancouver, B. C., the new showroom of Collier's Ltd., Canadian automobile dealers, has attracted considerable favorable attention since their grand opening in 1949. As can be seen in the photograph, a pleasing effect was gained through the use of curved porcelain-on-steel panels.

R. E. Strain, vice president and general manager of AllianceWare, Ltd., suppliers of the architectural porcelain, stated that the "showroom was our first attempt at enameling curved panels and I might say that we were most fortunate in the way that it turned out."

The panels, of the return flange type, were formed with light gauge braces welded on the back of the outside corners to prevent distortion during firing. Firing was accomplished in electric box-type furnaces with the panels in a hanging position. Following the finishing of the panels, the braces were cut off.

Semi-matte enamels were used both for the white and green, the green having a single coat and the white two coats.

Use special clips

The tower is a single angle iron frame for the upper half which rests

on a concrete lower half. For this section, special clips were spot welded to the angle iron frame. Elsewhere, the clips were screwed on to wooden batons precast into the concrete frame of the building at the time of erection.

This is the second architectural porcelain-on-steel installation which AllianceWare has done for Collier's. A service garage, erected two years ago, also has porcelain enamel facing. The use of the special clips in this installation were found particularly useful around the garage doors for the easy replacement of panels damaged by thoughtless drivers.

Range production from raw material to shipping dock

**tooling, fabrication, metal preparation, finishing, assembly, and packaging
and shipping practices in a plant keyed for 400 ranges per day**

by Gerald Eldridge Stedman



Today, even though its 500,000 sq. ft. of floor area is scattered among 17 buildings and much flow interference by the multi-floor arrangement of some of them, A. J. Lindemann & Hoverson Company, Milwaukee, has accomplished miracles in conveyorized material handling, and has developed fabrication, routing, and tooling techniques that are among the best observed among the 1081 plant visits made since 1942.

L & H employs 700 workers, operating two shifts on a 40-hour week. It has 3500 individual production pieces in float. All direct labor is on piecework incentive. Supervisional ratio, accident records, production per square foot, ratios of indirect costs and material handling are all considerably better than average. Its rework, reject and scrap records are in a sense, phenomenal.

A private 300 ft. siding of double track and 400' single track extends the length of the plant, sufficient to accommodate 40 freight cars. Steel is received usually in 2000 lb. bundles of 24" x 48" dimension, 12 to 30 gauge cold and hot rolled steel. It is unloaded into two storage rooms that have the inconvenience of low, 10' ceilings. L & H has developed a derrick with 12' span and electric hoist, operating on rail wheels that straddle, grab at 75 to 100 sheets. The derrick is accommodated by rails down all aisles, and can move and stack these storage piles of sheet steel without any overhead swing. The

sheet moves in high dolly trucks to shearing. The typical flow is from storage to shears, to presses, to press room stock, to sheet metal department, to finishing departments and assembly.

The press department, once belt driven, has been motorized. Better than 75 presses in capacities up to 250 T are maintained, including extensive batteries for punch, draw, stamping and forming.

Dies carry color symbols for simplified assembly

The tool department, with a staff of 20 tool designers and makers, accomplishes all tooling except for special programs, and its eight sections are very completely equipped. It produces and repairs all dies for the punch press department. Some L & H tooling methods are unique. For example, from a variety of perforating and notching dies which carry color symbols in relation to sizes, it assembles its punch and die plate dies (which have matching color symbols) quickly, these dies being doweled into the plates in agreement with this color system, providing an inexpensive way to build big dies with quick punch selection. The plates are placed in indexed storage upon disassembly, saving a very considerable die investment.

The old turret type welding jigs of box design which rotated and revolved on circular tracks have been replaced by light locating strips, actually using the production department for tooling with a very great decrease in labor and material costs. Presently, experiments are being made with

magnetic holds and locating fixtures, further to simplify tooling.

Precision layout table for punch press department

In the punch press department, a precision layout table is maintained with the latest precision instruments. As the first production run piece comes from the presses, it must be approved by the layout inspector at this table before the run can be started. L & H tolerances get down to .003". After the production run has been made the layout inspector must approve the return of the die to storage, all repairs being made before its return.

All presses are thoroughly guarded. All plant workers wear safety goggles and, where required, safety shoes. Accident frequency is 5.6.

L & H produces an extensive line of electric ranges and electric water heaters, oil ranges, oil heaters and wicks with national distribution under the trade names of Lectro-Host, Kerogas and Alcazar. About 75 per cent of production is in electric, 25 per cent is in oil appliances. Material handling is 11.3 per cent of total indirect cost.

The company maintains an unusually simple and effective production control by a tandem board arrangement which establishes the work schedule pattern for every press group, both in relation to work and planned load over a two week period. A store room weekly inventory report of material used is a regular routine. A schedule of regular conferences on organic finish losses, enamel losses, complaints, cost re-



Left: Special derrick, operating on rail wheels, is used in low-ceiling room for handling 2000-lb. bundles of from 75 to 100 steel sheets.



duction, new appliances, safety, production control, engineering, and foremen's meetings are held to keep the top personnel thoroughly on top of plant activities. A waste ticket and scrap ticket form on re-work is maintained which enters the individual employee record. There is also a chemical laboratory weekly report. These varied systemizations are simple and effective. Though the top executives attend the weekly conferences, they are chairmanned by one of the particular group meeting, usually the foreman or department head.

After the work leaves the press department it is placed in press storage. Most plants maintain no storage for press room work. This feature of plant layout greatly improves material handling efficiency.

Good housekeeping rated weekly

All departments are given good housekeeping rating each week by a committee of three foremen, serving for three months. The department ratings are: A—very good; B—passable; C—disorderly; D—intolerable. The plant housekeeping is exceptionally good, most departments showing an "A" rating upon my visit.

From punch press storage, the work moves to welding, brake work, finishing, and final assembly departments. Handling is by tote box, and these have uniform corner angle guides for stacking three high. Much of the work is moved by palletizing. A main conveyor takes the work aloft, outside and over buildings



Center: All grinders in the L&H modern tool department are equipped with exhaust facilities.

Left: Tooling methods are featured by a careful check on a precision layout table. Tolerances are in the order of plus or minus .0015.

Right: From a variety of dies, assembled with color symbol control, L&H forms its punch and die plates to save tooling costs.

from sheet metal to porcelain enameling and back to final assembly. This transportation conveyor is 1700 ft. long.

Seven steps in range body fabrication

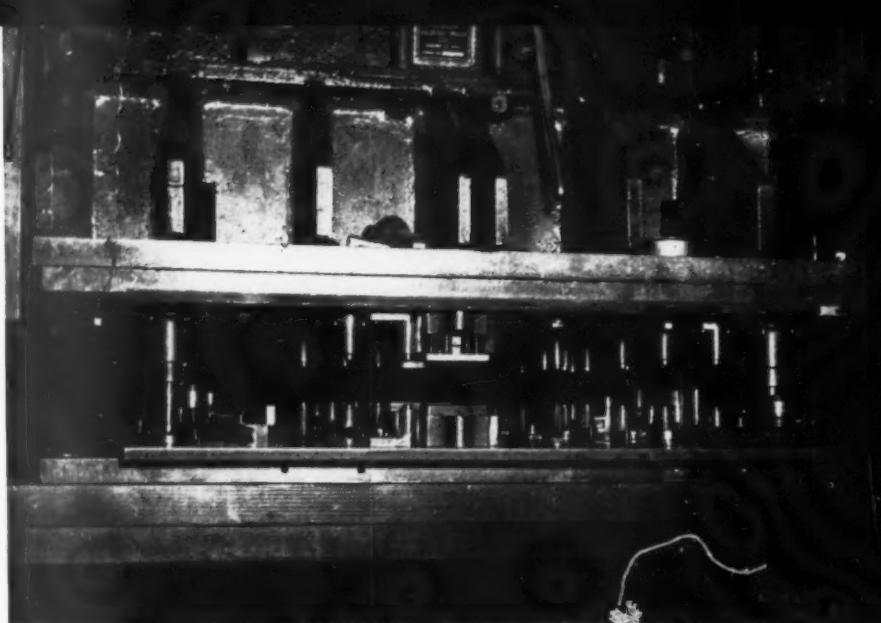
In the sheet metal department as part of the sequence of seven major steps used to fabricate the electric range body, 36" x 89", 18 gauge vitreous deep draw sheet steel is received from the press department in the flat with perforations and notches, and comes to the platform of a 150 ton (18" daylight) press with two dies and two operators, working front and back, who perform two blanking and two drawing operations, producing one piece each hit to achieve a 150 pieces/hour production. The work then moves to the 250 ton press where the range body receives final draw of front and flanging of four sides, along with the drawing of the toe space. A $\frac{3}{4}$ " flange is involved here. Then the body, these draws accomplished, is formed into a "U" on a hand former of portable nature which bends the two sides. The body is then ready for welding.

Resistance welding used extensively

Extensive use is made of resistance welding throughout the plant. For example, the valve stem and wheel for the oil stove, formerly riveted, are now welded on a 35 KVA controlled resistance welder, fixtures of L & H design, the lower electrode

Center: Following draw operations, range bodies are U-folded in a special jig preparatory for welding.

Right: L&H depends heavily on resistance welding, using a battery of gun welders, current, pressure and cycle being automatically controlled





Left: Pickling basket has copper contact bar suspension. Method of loading provides free access for solution to all ware surfaces.



being split, the work clamped by air pressure and tripped by foot, to achieve a production of 500 pieces per hour.

A battery of 50 KVA gun welders are employed in the welding sequence, two welders to each station. There is very rigid welding control, determined for each job, involving current, pressure and cycle. There is no difficulty with welds breaking open, this trouble being unheard of in the field. Slugs are pulled, destruction tests are made, unusually close supervision is maintained.

Four hinge housing clips are welded to the body. Light fixtures with hole locators are used, flanges and supports are welded on, the corners are welded front and back, the work comes to metal finishing where weld splatters and "kinks" are disc-ground and the body receives 100 per cent inspection before being placed on the 1700 ft. conveyor where the body moves to finishing and final assembly. This 1700 ft. conveyor carries both flat work and fabricated pieces. The line moves at 400 bodies/hour.

"Electric cleaning" used

The flat work, bodies, ovens and tops arrive on the transportation conveyor to the receiving and unloading room of the porcelain enamel shop. This 30' x 40' room is a storage area which forms a bank for the ware to be pickled. It is placed in baskets of varied sizes, each having a copper contact bar suspension for electric cleaning.

There are two similar pickling lines



Center: On this ground coat line, flat ware is dipped. Ovens, bodies and tops are sprayed.

Left: Spraying ground coat on bodies, range tops and ovens is done in a 30-foot station which has from one to four sprayers.

Right: Ware leaving dryer on right goes to brushing station where ware is brushed on the line without removal from chain hooks.

of eight tanks each in the pickling room, served by monorail hoist, and handled by one operator. The room has four large exhaust fans and is free of fumes. Exhaustive studies have been made in racking ware in the pickling baskets so that solutions have free access to all surfaces. Damaged or improperly made parts are corrected before loading.

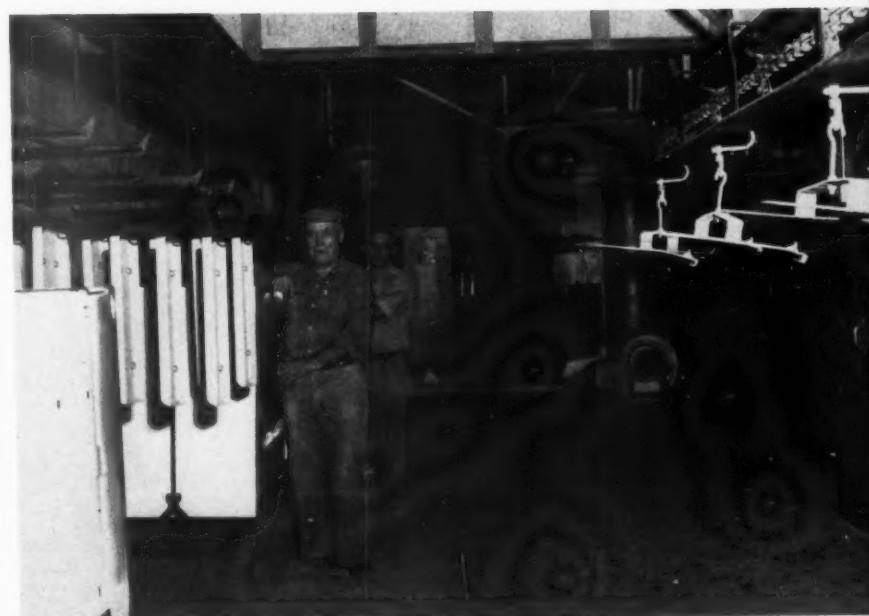
The first of the sequence of eight tanks, both lines similar, involves electric cleaning, using caustic soda and sodium metasilicate, the tank being of 970 gallon capacity. Electric current is used at approximately 1800 amperes at 5 volts, with the work as the anode. Current readings are checked frequently by the operator. All contact surfaces of tanks and baskets are cleaned each day. Automatic temperature control is adjusted to maintain 200-210 degrees F. The solution alkalinity is held between 8 and 9.5 oz. per gallon as NaOH. The solution is dumped and replaced after three months use. Processing time regularly is 10 minutes.

After cleaning and pickling respectively, the work receives two rinses in tanks No. 2 and No. 5. Tanks Nos. 3 and 4 are sulphuric acid pickle, tank volume being 960 gallons, operating temperatures from 145 to 150 degrees, pickling time of regular ware is 8 minutes, of range tops is 20-25 minutes, the control range is from 5. to 6.50 per cent acid with a daily addition of 60 lbs. The tanks are dumped in approximately three to four months, before showing 5 per

Center: Furnace chain accommodates both ground and finish coat. Ware is fired in butane-fired furnace.

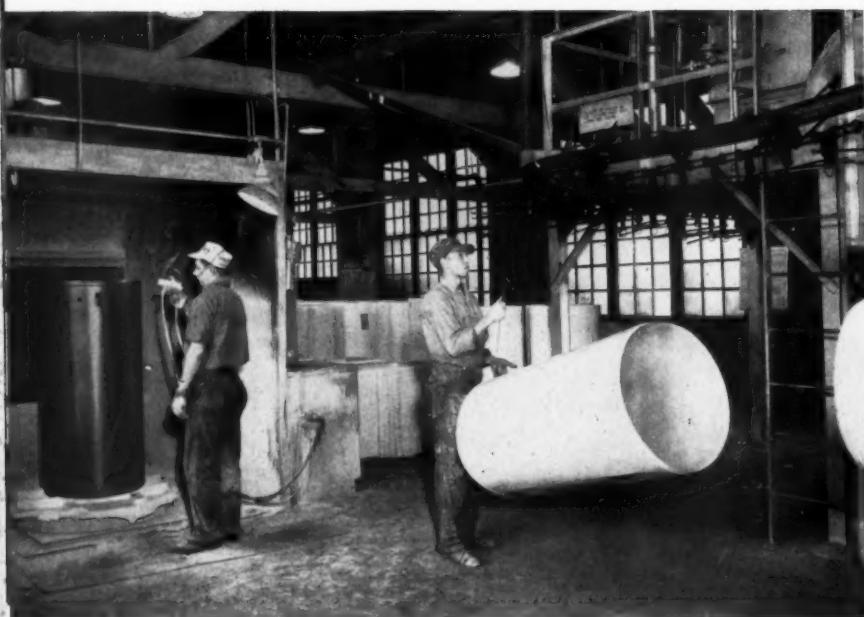
Right: Reflectance grading is provided for by photo-electric cell at station on inspection belt. Cell is calibrated to standard whiteness.

MARCH • 1950 finish





Left: Operator removing small table oil stove parts from baking oven conveyor. These parts are finished with synthetic enamel.



cent iron. Tank No. 6 is a nickel dip in a tank volume of 850 gallons, with an operating temperature of 168-172 degrees F., the operating time being 8 minutes. The control range of the nickel is .02-.05 oz./gal., with a pH reading -5. to 6.2. This tank is dumped daily. Tank No. 7 is a neutralizer of caustic soda and borax at an operating temperature of 190 to 200 degrees F., for 8 minutes, the control range being .14 to .20 per cent of Na2O, and the tank is dumped daily.

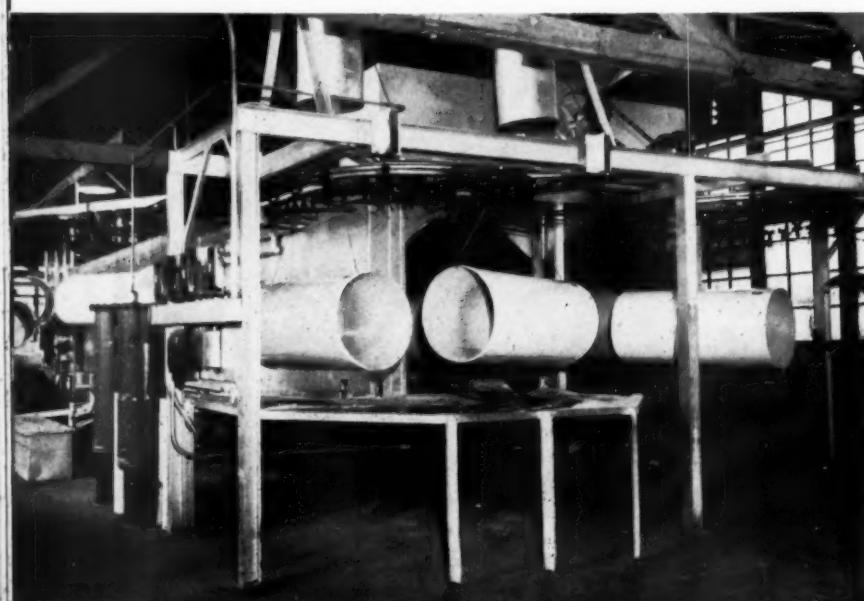
Tank No. 8 is a dryer tank, steam heated and employing forced air.

**Ground coat sprayed
on ovens, bodies and tops**

The ware comes from pickling by hand truck to two ground coat lines. Flat ware is dipped. Ovens, bodies and tops are sprayed.

The continuously filtered dip tank is used. The dip coating overrun is troughed into a sump and repumped through a filter into the tank for reuse. The dip also runs through magnetic separator. A portable tank supplies the ground coat requirements from the mill room. The dipped ware is placed upon adjustable easel conveyors, able to take any flat piece for proper drainage. After dipping, the ware makes three passes through the dryer, fired by butane, at temperatures of 250-300 degrees F. Edges are then reinforced by spray gun in two booths, one handling front, the other handling back of ware. The ware is then transferred to burning chain and the easels, travelling on

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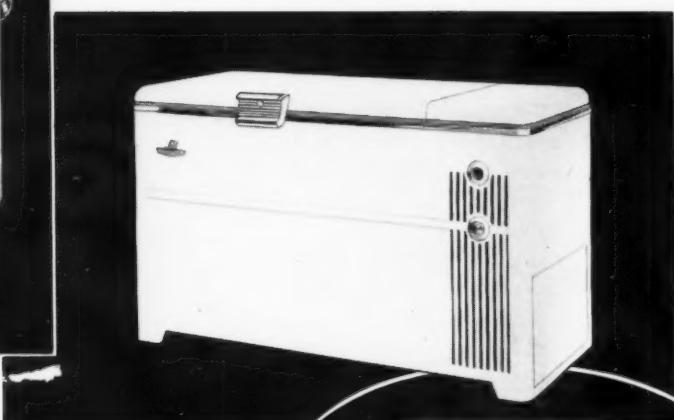
Center: One operator is spraying synthetic enamel on water heater jackets while helper is loading the baking oven conveyor chain.

Left: Entrance and exit end of continuous baking oven, showing the water heater jackets in production.

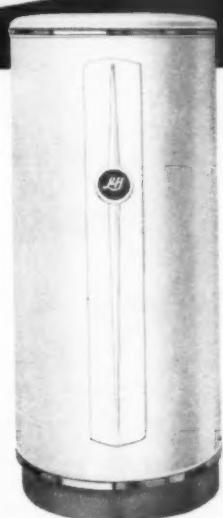
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LECTRO-HOST
ELECTRIC RANGES

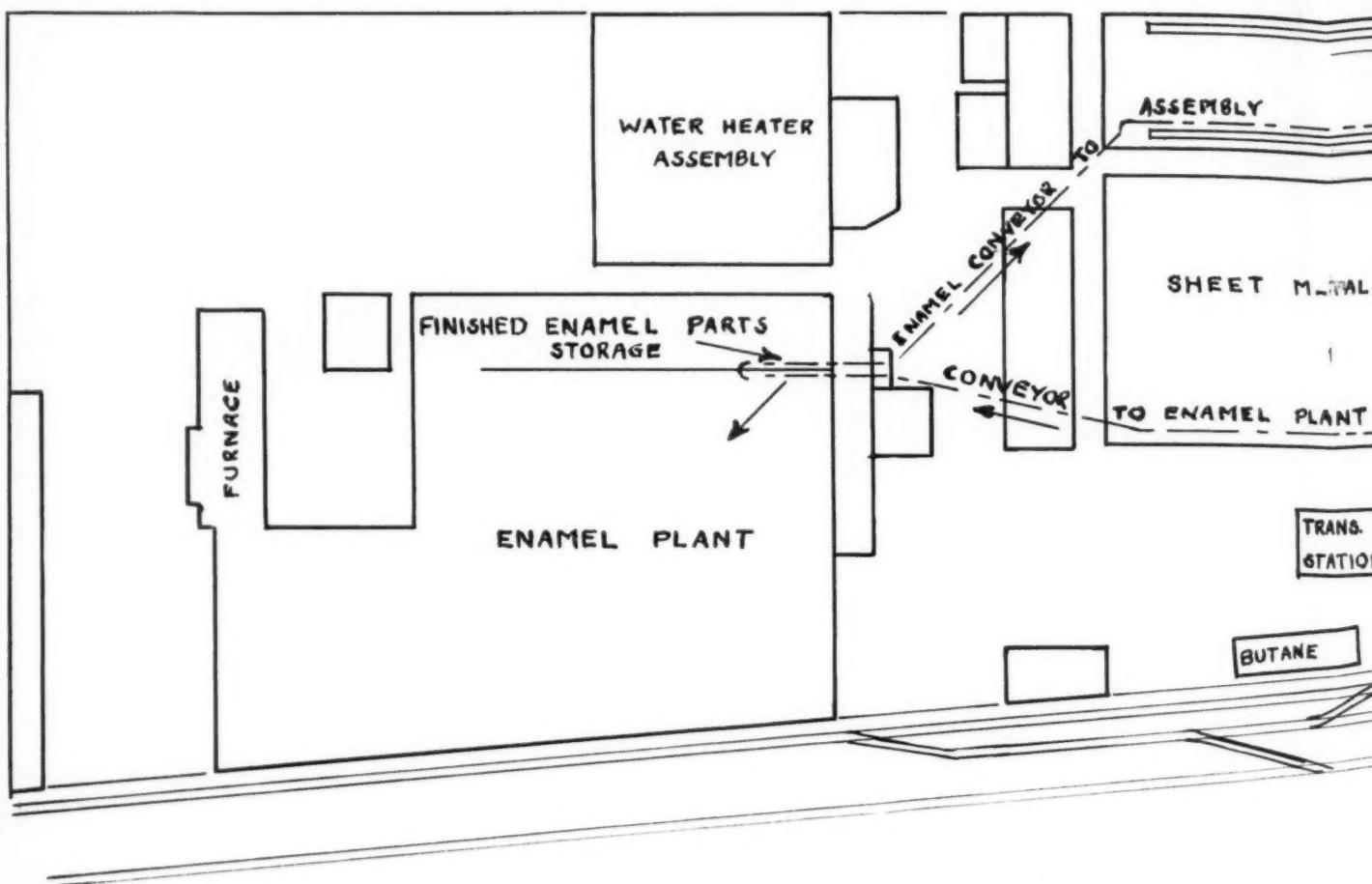


TAKE YOUR
PROBLEM
TO ...

NUBIAN PAINT AND VARNISH CO.
CHICAGO 39, ILLINOIS
DIVISION OF THE GLIDDEN COMPANY
National Headquarters • 11001 Madison Ave., Cleveland 2, Ohio
Factories and Sales Offices in Principal Cities

Glidden

*Industrial Finishes
for every purpose*



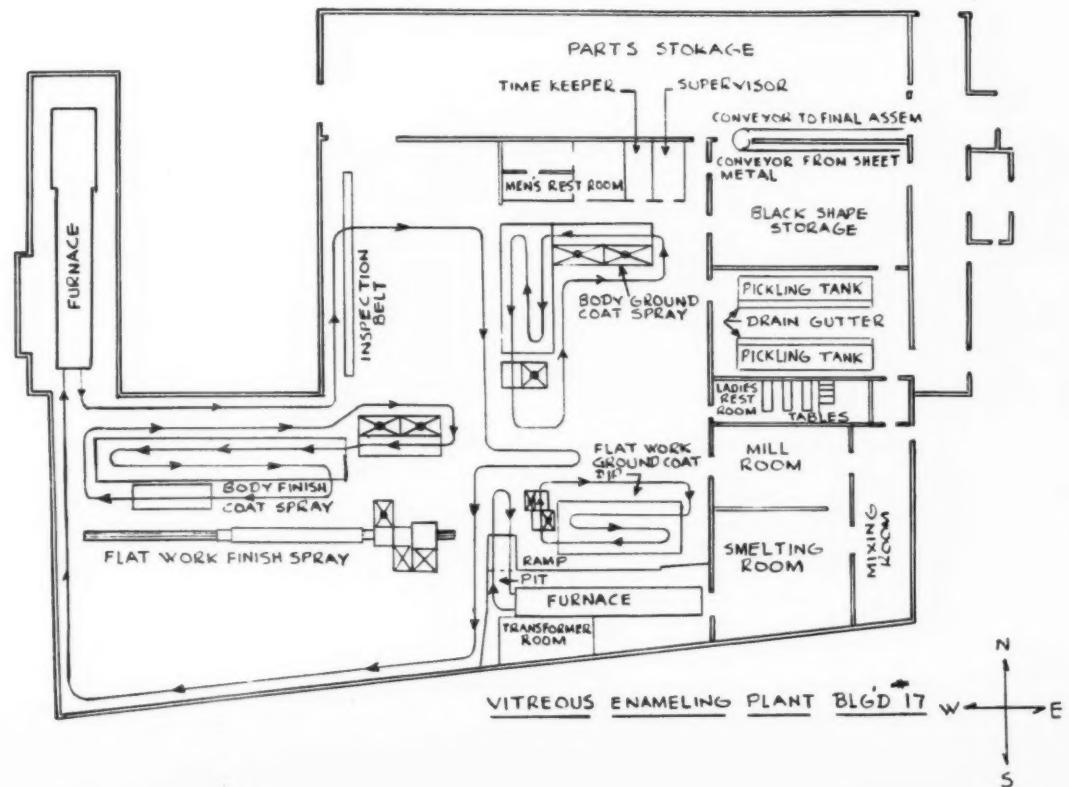
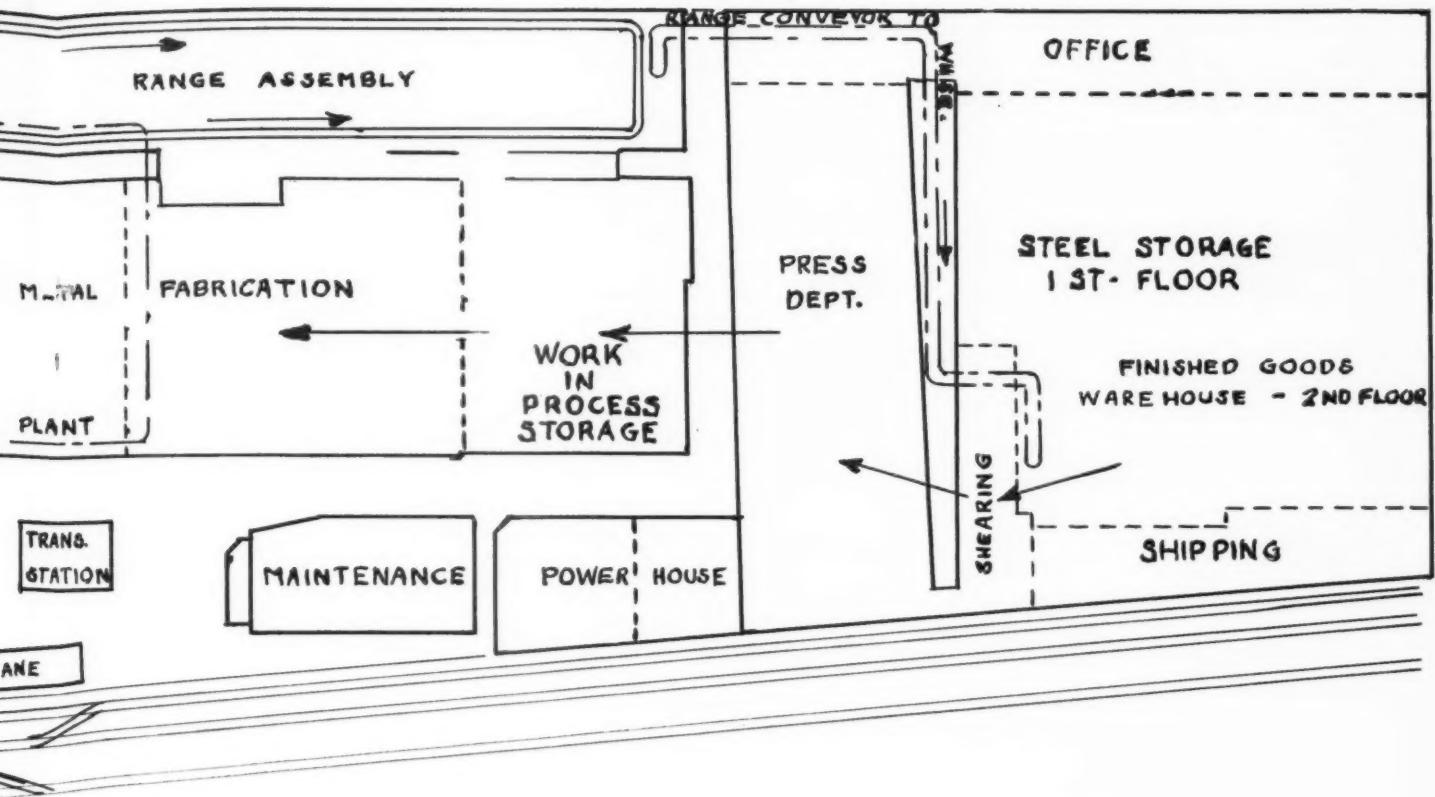
Layout of plant designed

to produce 400 ranges a day

smaller layout on right shows details
of the enameling department

Author's Note:

The A. J. Lindemann & Hoverson Company has enjoyed a rather spectacular upthrust and rejuvenation during the war period and since. Organized in 1875, it became a leading producer of stoves, only finally to fall upon hard times in 1929. It showed no adequate profits during depression years, and its troubles culminated in a brittle, seventeen-month strike in 1937 that resulted in management reorganization. Eugene A. Lindemann was made president and general manager. In 1940, he induced H. J. Berman to leave a successful experience as chief planning engineer of Edison General Electric Appliance Company and join L&H as executive vice president and works manager. They installed drastic reorganizations in all departments and instituted advanced shop practices and processes.





Left: At end of assembly line is final inspection tunnel equipped with four banks of parallel fluorescent lights.

the endless conveyor are returned through a washing station where they are automatically cleansed by water shower before the next dip cycle.

Butane gas used for all heating

Burning tools are designed to allow multiple hanging and full furnace loading. Both ground and cover coats are burned together, travelling on the same conveyor. This line moves at 10½ ft. per minute and the burning conveyor enters the U-type radiant tube furnace, fired by butane. The total furnace length is 84 ft. with a 42 ft. firing zone at 1550 degrees F. 17,000 and 30,000 gallon butane storage tanks are maintained and consumption is about 35,000 gallons per month to supply gas fuel for all manufacturing purposes. This system is arranged so that propane could be used with proper adjustment.

The interesting thing about the porcelain enameling layout is that the burning chain runs wherever it may be loaded. The usual criticism of this type of layout is that it picks up and wastes heat by such extensive travel out of the furnace, but the experience here is that the heat loss is insignificant, and that much saving is made in trucking. The burning chain is geared to 400 ranges/day, and is ready to receive and transport any type of ware at any moment it is ready.

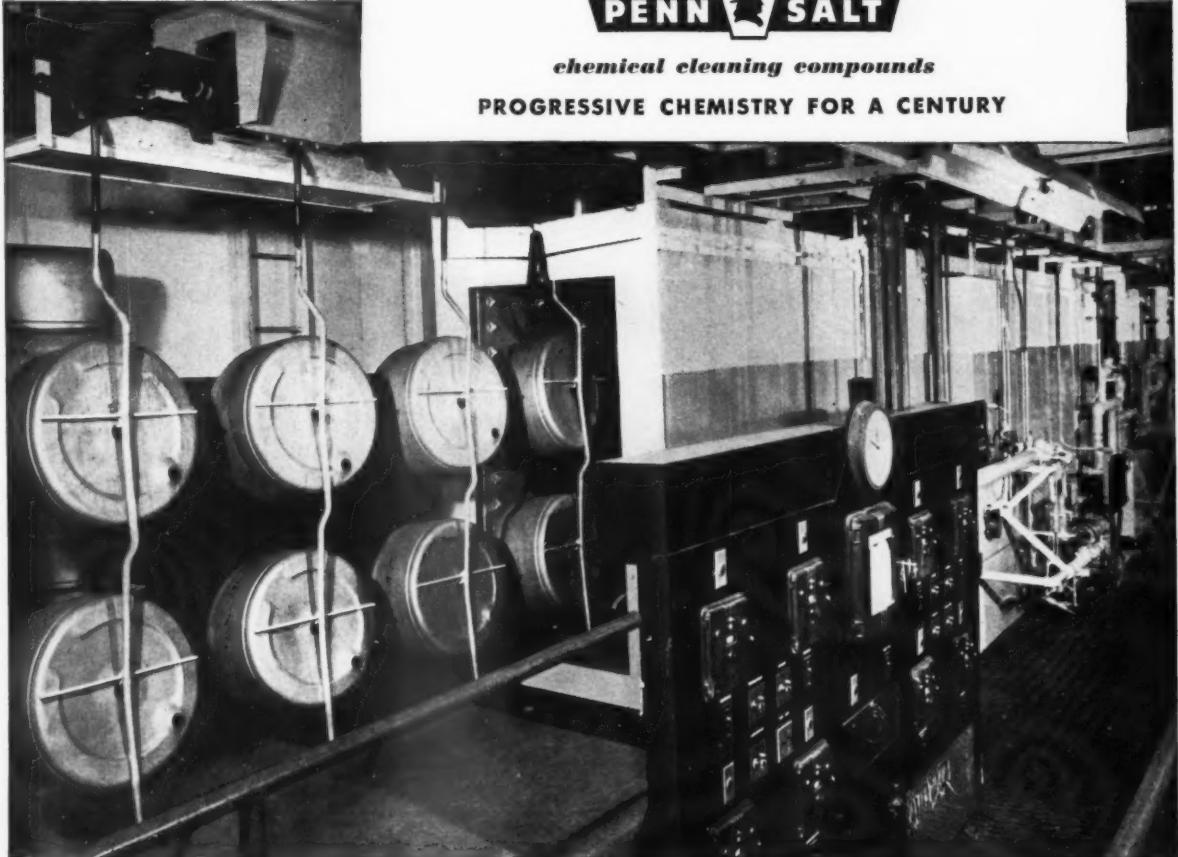
The finish coat of the flat ware is accomplished on a 5-strand lay down conveyor by automatic spray. Two to Page 69 →

Center: Thick corrugated pad laminations are shown being placed on one of the corners of a range.

Left: L&H ranges are crated so that the company has experienced less than .005 per cent in-transit damage.



In 80 seconds
washer tubs
come clean
prior to
enameling
...with
PENNSALT
METAL
CLEANERS



When a huge press throws a 1000 ton punch into 18 gauge steel, it really pounds the drawing compound into the steel surface. In other words, a tough cleaning job pops up.

Yet 80 seconds' spray treatment with Pennsalt Cleaner solutions enables Heintz Mfg. Company to dig that soil out . . . leaving these home washer tubs clean and ready for the pickling and porcelain enameling operations.

In this method, Pennsalt EC-12* and Pennsalt* 30 have done such a fast, efficient job that Heintz has had no cleaning rejects since the installation was made.

Satisfactory cleaning like this is being enjoyed all over the country by plants using Pennsalt Cleaners. Call in your Pennsalt representative, he'll be glad to discuss with you savings of time and money with Pennsalt's complete line of metal cleaners. Special Chemicals Division, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

*REG. U. S. PAT. OFF.



chemical cleaning compounds

PROGRESSIVE CHEMISTRY FOR A CENTURY

Sign men hold annual meeting

OVER 1200 men interested in the design, construction, sale, and erection of electric signs met for the 4th Annual Convention and Sign Equipment Exhibit sponsored by the National Electric Sign Association at the Netherland Plaza Hotel, Cincinnati, Ohio, February 6, 7, and 8.

A three-day program of business, plant trips, and entertainment resulted from the work of the Convention Committee, consisting of:

Chairman H. B. Link, Bellows Electric Sign Corp., Akron; W. A. Barrows, Barrows Porcelain Enamel Co., Cincinnati; Wm. E. Blommel, Blommel Sign Co., Dayton; Lewis Carroll,

The Lackner Co., Cincinnati; James Ramsey, Jim Ramsey Signs, Lexington, Ky.; and D. R. Swormstedt, Signs of the Times, Cincinnati.

Among the leading speakers at the convention, and the titles of their addresses, were the following:

Roger Allen, Roger Allen & Associates, Grand Rapids, Mich. — "The Architect Believes in Signs"; Charles B. Burkhardt, president, Electrical Advertising, Inc., Kansas City, Mo. — "The Greatest Sin in Sign Selling"; William F. Breidenbach, advertising and sales promotion department, Frigidaire Division, General Motors Corp., Dayton, Ohio — "Designs for

Selling"; and Albert Marmon, manager, systems and sales promotion, Broadway Maintenance Corp., New York City — "How, Why and Wherefore of Sign Maintenance."

A fine display of materials, components and equipment composed the Sign Equipment Exhibit sponsored by the Association in connection with the annual meeting. One of the highlights of this exhibit was a 70-foot long display sponsored by the Porcelain Enamel Institute and individual members. The central exhibit for PEI was flanked by individual exhibits of Texlite, Inc., MacMath-Axilrod Corp.; Ingram-Richardson Mfg. Co., Seaporce Metals, and Barrows Porcelain Enamel Co. The individual sign exhibits included everything from the smallest type of production sign to sections of architectural por-



finisphoto

Left: Photo shows PEI sign exhibit.

Right: View of "Frontier Daze" banquet.



Left: Sign design judges, left to right, were: Ralph Peterson, Nat'l Restaurant Assn.; Kenneth Johnson, Jack Stone Co.; Marshall Lane, Coca Cola Co.; Dale Neal, Moore & Neal Co.; and Wm. F. Breidenbach, Frigidaire.



celain exteriors. In the PEI booth were demonstrations such as the "Frigidaire-Cannon", furnace for firing test samples, and an abrasion testing machine.

Principal plant visit for the sign men was an inspection tour of the Armclo Steel Corporation mill at Middletown, Ohio. 160 sign men travelled by bus from Cincinnati to Middletown where they enjoyed an inspection tour and buffet supper.

Bright spot on the entertainment program was the annual NESA party, "Frontier Daze," held in the Pavilion Caprice of the Netherland Plaza. Over 300 sign men and a fair percentage of wives attended this dinner and evening of entertainment.

Sign design contest awards

Over 132 entries were on display for the annual Electric Sign Design Competition. Awards of prizes were announced by D. R. Swormstedt, of Signs of the Times. The awards were as follows: 1st prize, \$500.00, Hal G. Maurer, Electrical Products Consolidated, Yakima, Wash.; 2nd prize, \$200.00; Mervin J. Updegraff, Ra-



View of display of individual members of Porcelain Enamel Institute.

Lite Neon Sign Company, Columbus, Ohio; 3rd prize, \$100.00, Robert C. Carlson, Electrical Product Corporation, Los Angeles; 4th prize, \$50.00, Robert L. King, Neon Products of Western Canada, Ltd., Victoria, British Columbia.

Six honorable mention prizes, \$25.00 each, were awarded to the following: William H. Ferguson, Texlite, Inc., Dallas, Texas; Booth Yonka, The Lackner Company, Cincinnati; Monroe Leung, Electrical Products Corporation, Los Angeles; Del-

bert T. Boyer, Bellows Electric Sign Corp., Akron; Andrew E. Darling, QRS Neon Corp., Ltd., Los Angeles; and Jack Harris, Fennell Neon Corporation, Miami, Florida.

A beautiful Steuben Glass trophy was also awarded to Electrical Products Consolidated because Mr. Maurer's entry received the highest award.

The following NESA officers were reelected for another year: President,

to Page 73 →

Additional photos →





This group met in a sectional meeting during NESA convention in Cincinnati. It represents the Sign Division of the Porcelain Enamel Institute. Discussion covered problems of color standardization, specifications, guarantees, and promotional effort. The PEI Sign Division sponsored what was claimed as the outstanding exhibit in the Sign Equipment Exhibit.

finishfoto

Sign men tour Armco steel plant



L. T. Johnston, general sales manager of Armco Steel Corporation, left, welcomes J. C. Allen, NESA president, and Maurice Ely, NESA executive secretary.

Some of the 160 members of the National Electric Sign Association who toured the Armco plant are shown watching the continuous rolling of sheet steel.



NEWS

HART NAMED MCCRAY PRESIDENT

J. W. Hart, formerly executive vice president, has been named president of McCray Refrigerator Company, Kendallville, Ind., according to an announcement by the board of directors. Mrs. E. E. McCray, formerly president of the company, was elected chairman of the board, filling the vacancy caused by the resignation of Paul W. Miller.

Hart's service record with the company covers a period of 43 years. He joined the organization March 7, 1907, as a stenographer in the sales department. Since that time he has filled every executive office except that of chairman of the board. He had been executive vice president since June 1, 1943.

CUYAHOGA SPRINGS APPT.

News comes to *finish* that E. W. Misamore, sales manager, The Cuyahoga Spring Company, has been elected vice president of the firm.

NASH-KELVINATOR NAMES ROMNEY VICE PRESIDENT

George Romney, assistant to the president, was elected a vice president of Nash-Kelvinator Corporation at a recent meeting of the board of directors at which all other officers were reelected, according to an announcement by George W. Mason, president.

Formerly managing director of Automobile Manufacturers Association, Romney has been assistant to *finish* MARCH • 1950.

the president of Nash-Kelvinator since March, 1948.

SOUTHWESTERN PORCELAIN APPT.

George Greene has been appointed manager of factory operations for



Southwestern Porcelain Steel Corp., Sand Springs, Okla., according to an announcement by Paul Wilhelm, president. Greene joined the year-old firm after nearly 40 years experience in the fabricating and porcelain enameling sheet steel parts, including signs, appliances, and architectural porcelain.

The plant is the only porcelain plant in Oklahoma and specializes in porcelain signs, architectural porcelain and jobbing. Howard Michel, operating as Porcelain Enamel, Inc., formerly of Baltimore, has moved his operations to Tulsa to handle sales and engineering for the architectural

division. John Lauder is vice president in charge of sales.

NORTON ELECTS VICE PRES.

Milton F. Beecher, director of research since 1941, was elected vice president in charge of research and development of Norton Company at the 64th annual meeting of the firm. Directors of the company reelected George N. Jeppson as board chairman and Milton P. Higgins as president.

Beecher entered the company's ceramic section in 1915, becoming chief of that section the following year. In 1919, he was appointed research engineer.

ATTENTION MANUFACTURERS OF WASHERS AND IRONERS

New bibliographies on creasing and water-repellency of textiles are discussed in a brief review just released by the Office of Technical Services of the U. S. Department of Commerce.

The bibliographies, prepared by the Army Quartermaster Corps to assist in the advancement of textile research, contain descriptive summaries of principal papers on these subjects as far back as 1937.

The textile bibliographies, as well as other technical developments, are reported in the current issue of the "Technical Reports Newsletter" issued monthly by OTS.

CHICAGO PMI GROUP DISCUSSES NEW FABRICATION IDEAS

More than 225 stampers attended a "new ideas" meeting of the Chicago District of the Pressed Metal Institute held at the Graemere Hotel, February 8.

Subjects discussed at the dinner-meeting included: a revolutionary perforator to punch many holes which are now drilled; a metal disintegrator to save time in die changes and in removing broken taps, etc.; a method of "glueing" presses, lathes, and grinders to the floor instead of using bolts; a slow motion camera to aid in locating troubles in drawing dies; and an "erector set" method for making die racks, stock tables, etc.

R. C. Hedrich, of Peterson Produc-

tion Corp., introduced C. C. Caditz, of Northern Metal Products Co., past district chairman, who acted as a moderator during a discussion period following the dinner.

Guest speakers included Jerry Singleton, assistant manager, Pressed

Metal Institute; A. J. Crowe, of Uni-strut Products Company; C. A. Vick, of The Felters Company; W. B. Pearson, Sr., of Metal Disintegrator Co.; and Jerry Reinertson and R. E. Coleman, of Pivot Punch & Die Corp.

INDUSTRY LEADERS ADDRESS LUBRICATION PANEL



More than 1200 of the nation's design, production and maintenance engineers and plant managers attended a panel discussion on "Preventive Maintenance as Influenced by Proper and Improved Lubrication Practice" which was held recently in Cleveland, Ohio.

Among the panel leaders, left to right in photo, were: E. Ralph Morris, Alemite Division of Stewart Warner Corp., moderator; O. L. Maag, Timken Roller Bearing Co.; C. E. Pritchard, Republic Steel Corp.; G. L. Sumner, Westinghouse Electric Corp.; and L. A. Danse, General Motors.

TITANIUM ENAMEL DIRECT TO STEEL IS SUBJECT FOR 3 ENAMELERS CLUB MEETINGS

"Titanium Enamel and Its Application Direct to Steel" was the feature subject at the meeting of the Eastern Enamelers Club, held December 3, Sylvania Hotel, Philadelphia, and the January 27th meeting of the Central District Enamelers Club, held at the Allerton Hotel, Cleveland. The same program will be presented at the March 4th meeting of the Midwest Enamelers Club in Chicago at the LaSalle Hotel.

The subject was discussed by a panel of experts from Westinghouse Electric Corp., Mansfield, Ohio, one of the pioneer companies in the use

of titanium enamels direct to steel, including J. B. Simons, enameling superintendent; R. F. Bisbee, manager of quality control; and C. L. VanDerau, works manager.

The board of experts, representing respectively research and processing, quality control and results of control tests, and management and costs, cover the following:

Case history of Westinghouse research work and standardization to reduce thickness of vitreous enamel coatings that led to starting work on applying the cover coat directly to the steel; Early investigation results

with Research Division, Inland Steel Co.; Brief description and characteristics of titanium steel compared to regular vitreous enameling iron; Titanium enamels; Range platforms chosen for first experimental work; Results of first trial runs compared to regular vitreous enameling steel with ground coat; Purpose and functions of titanium committee appointed by management; Summary of problems encountered, reasons and corrective action taken in developing the process; Summary of process control test and results of improvements in enamel adhesion, resistance to breakage and methods of tests; Results of first field tests in Mansfield, Detroit, and Pittsburgh; First in industry to start new process 100% in part of one product and results with over 200,000 completed; Results of experimental lots where new process was used on complete range; Summary of improvements made on titanium steel and frits; and Possibilities for tomorrow's enameling for the industry.

In addition to the Westinghouse experts, Frank R. Porter, of Inland Steel Company, presents a brief outline on "titanium steel."

Publication of more complete details of the program are held pending presentation of the program before the Midwest Enamelers Club.

ALFRED U. LECTURE SERIES

Three outstanding authorities in ceramics, two from Europe, will lecture at New York State College of Ceramics, at Alfred University, in the next three months as part of the school's 50th anniversary celebration. Each of the men will give a popular lecture open to the public and will conduct a more technical seminar for graduate students and members of the college faculty.

The speakers, as announced by Dean John F. McMahon, are Dr. Martin J. Buerger, professor of mineralogy, Massachusetts Institute of Technology; Prof. Johann A. Hedvall, of Chalmers University of Technology, Sweden; and Dr. Wilhelm Eitel, former director, Kaiser-Wilhelm Institute for Silicate Research, Berlin.

The appointment of Arthur L. Wales, of Providence, Rhode Island, as field training director of The In-

stitute of Boiler and Radiator Manufacturers has been announced by R. E. Ferry, general manager.

FERRO LTD. HOLDS REFRESHER COURSE FOR ENAMELERS



The photo above shows a group of enamel technicians who attended a "Refresher Course" in porcelain enameling which was conducted by Ferro Enamels Limited, Wolverhampton, England, in November.

Subjects discussed at the annual event included: "Furnace Atmospheres

and their Effect on Enamel Surfaces", "Application and Firing of Low Temperature Sheet Iron Enamels", "Firing Ground Coat and White Together", "Steel for Enamelling", "Annealing Cast Iron", "Blasting", "Effect of Mill Additions on Colour" and "Pyrometry in Enamelling."

HOTPOINT TO BUILD NEW REFRIGERATOR PLANT

James J. Nance, president of Hotpoint, Inc., has disclosed that the company will erect a new refrigerator factory on a 21-acre site at 54th Avenue and 16th Street, Chicago. The projected factory will be directly across the street from the company's new electric range plant.

The refrigerator plant will be completed within 15 months and should be in production within 18 months, asserted Nance, who also disclosed that tooling and machine installations to complete the conversion of the company's former range plant for the manufacture of home laundry equipment would be completed this year.

These moves, which represent the final phase of the company's expansion program launched in 1947, will be accompanied by moving the manufacture of their disposal unit from an Eastern plant into the company's plant at Milwaukee where it will be made along with automatic dishwashers and sink units as a companion piece.

With these moves, all of the company's facilities for the manufacture

products being produced in company-operated plants. At the same time the company's engineering will be consolidated by the movement of the engineering department for commercial cooking equipment to the main research laboratories at 227 So. Seeley Avenue.

Hotpoint's complete line of appliances, which will be produced in the Chicago area, include ranges, automatic dishwashers, refrigerators, automatic washing machines, water heaters, garbage disposals, freezers, clothes dryers, base and wall cabinets, and sinks.

IBR RESEARCH TOLD AT U. OF I. PLUMBING SHORT COURSE

How the I-B-R research program is helping to improve the performance of hot water and steam heating systems was brought to the attention of students in the short course on plumbing at the University of Illinois, January 31, February 1 and 2.

Approximately 135 persons attended the 3-day course on plumbing and hot water and steam heating which was sponsored by the Illinois Master Plumbers Association and the Department of Civil Engineering at the University.

REVEAL "12-MINUTE METHOD" FOR MAKING STEEL

Working details of a new fast steel-making process were presented before the annual meeting of the American Institute of Mining and Metallurgical Engineers, held February 16 in New York City. Called the "Turbo-Hearth", the new process was said to be capable of making open hearth-quality steel in 12 minutes without using external fuel.

The men who described the process and who are said to be largely responsible for its present development are C. E. Sims, assistant director of Battelle Memorial Institute, Columbus, Ohio, and F. L. Toy, assistant to the manager, research and development division of Carnegie-Illinois, largest subsidiary of United States Steel Corp.

The hearth chamber in which the

new "special process" steel was made experimentally, according to drawings presented with the formal paper, was shaped somewhat like a giant coffee-maker, built of heavy steel sections and lined with basic brick which can stand temperature ranging higher than 3000° F. It was suspended on trunnions so that its spout might be raised during the heating period and lowered for charging and to pour the finished steel into ladles or ingot molds.

Like the product of the Bessemer converter, "Turbo-Hearth" steel is made without external fuel, the heat being provided from chemical reaction by burning the impurities in liquid iron with a blast of air. The air is applied from the side, at the surface of the hot metal charge. →

Briefly, the paper presented by Sims and Toy drew the following conclusions, which many authorities believe may have an important bearing on the course of steel making in the United States:

1. "Steel can be made by surface-blowing on a basic-lined hearth.
2. "Mechanical properties of 'Turbo-Hearth' steel are equal to those of open hearth steels of the same grade.
3. "Standard basic pig iron is entirely suitable as a raw material.
4. "Average time of heat was 12 minutes.
5. "'Turbo-Hearth' steel contains a minimum of such undesirable elements as sulphur, phosphorus and nitrogen."

In the course of their work, the researchers first made thirty-two 1000-pound heats of steel in a laboratory at Battelle Institute. The results of these small test heats were verified by making fifteen commercial-scale heats at the South Chicago Works of Carnegie-Illinois in a 30-ton vessel loaned by Jones & Laughlin Steel Corp. and specially lined with basic refractories.

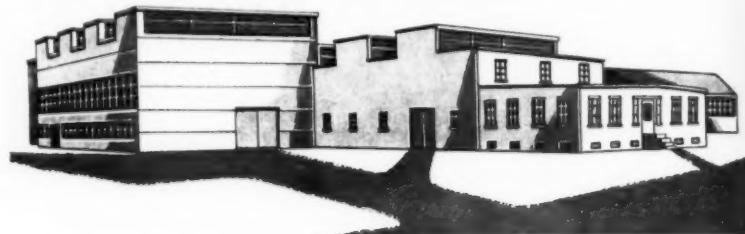
The steel produced was cast into ingots, rolled into plates, and sub-

jected to exhaustive tests to ascertain such vital mechanical properties as tensile strength, bending, strain aging and impact. In every respect, Sims and Toy asserted, "Turbo-Hearth" steel behaved like open hearth steel of similar composition.

The development is regarded as especially important because it provides a steelmaking method that is

fast yet flexible. A hearth of 30-ton capacity is said to be capable of making much more steel in a day than a 225-ton standard open hearth furnace. Many or few hearths may be used, as demand for steel production warrants. Most significant is the fact that oxygen may be added to the standard air blast still further to speed steelmaking if occasion demands.

METALWASH ANNOUNCES OPENING OF NEW PLANT



Metalwash Machinery Corporation, formerly of Irvington, N. J., has announced the opening of its new plant located on U. S. Route 1 at North Avenue, Elizabeth, N. J.

The manufacturing area of more than 30,000 square feet is served by traveling cranes with capacities up to 35 tons, as well as railroad sidings. New machinery has been installed to speed the production of the compa-

ny's industrial washing machines, dryers, pickling machines, quench tanks and draw furnaces, bakery pan and rack washing machines, pot washers, and other special machinery.

The plant has a two-story air conditioned office building containing executive offices, as well as purchasing, sales, engineering, and accounting departments.

PMI TO SPONSOR TECHNICAL SYMPOSIUM, MARCH 16-17

The Pressed Metal Institute has announced that plans have been completed for a technical symposium on cold extrusion of steel to be held at Hotel Carter, Cleveland, Ohio, March 16 and 17.

The first day will be given over to discussion of testing and prejudging performance of metals, with a series of speakers representing the stampers themselves: Inland Steel, discussing carbon steel; Great Lakes Steel, high tensile steel; Allegheny Ludlum, stainless steels; and Reynolds Metals, discussing aluminum. In addition there will be a discussion of practical testing techniques and the equipment necessary to such testing.

Members of the technical staff of Heintz Manufacturing Co., Philadelphia, who have played a large part in the American development of cold

extrusion, will present data which has helped bring this new technique to its present stage. In addition, representatives of lubricant manufacturers, essential to the process, will appear, as will press manufacturers.

The symposium is a joint undertaking of the Technical & Research and Industrial Mobilization Committees of the Institute. Representatives of the Munitions Board, Ordnance, and civilian organizations will also participate in presenting different aspects of this important advance in metal forming. The registration fee was announced as \$5.00, with the symposium open to all persons who are interested.

WATER SOFTENER CONVENTION

Water softener manufacturers will

have the opportunity for the first time in history of the industry of receiving a blueprint of future merchandising potential at their first annual meeting of the National Association of Water Conditioning Equipment Manufacturers, according to Fred V. Heyner, Association president.

The meeting will be held at the Sherman Hotel, Chicago, March 7 and 8.

AVCO LAUNCHES INTENSIVE KITCHEN DRIVE

American Central Division, Avco Mfg. Corp., Connersville, Ind., has launched its most intensive promotion of its American Kitchens, convinced it has the answer to some of the problems in selling and merchandising kitchens.

One of the biggest problems, the planning of kitchen layouts, has been

The BIG THREE...

in
Enameling Shops



If you are not using ALL THREE of these Hommel products, let us prove to you their superiority. You'll see the difference 59 years of concentrated effort makes.

OHCO FRITS—There is a Hommel frit for your every requirement. Made from the finest raw material obtainable, each individual blend combines the best properties de-

manded in a finish with bonding strength. **OHCO CLAYS**—Hommel 842 powdered enameler's clay has an incomparable research and performance test record.

OHCO OXIDES—Hommel enameling oxides are always uniform in color value and strength. Perfect color matching is an invaluable service you get from Hommel.

Laboratory Controlled Production of Ceramic Supplies

- FRIT for Steel, Cast Iron or Pottery
- CERAMIC COLORS
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- BRONZE POWDERS
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- EQUIPMENT

Our Technical Staff and Samples are available to you without obligation. Let us help you with your problems.

World's Most Complete Ceramic Supplier



solved, says a company spokesman. He stated they have devised a magnetized easel board and isometric plates of cabinets and sinks which give a three-dimensional effect and can be moved about on a magnetic board with ease.

For the use of its sales staff, the company has prepared planning booklets with isometric punch-outs which are gummed so that housewives can paste in their final kitchen plans, as worked out on the magnetic plate.

It was stated that American Central's 1950 advertising and promotion budget calls for the expenditure of \$300,000.

TO REVIVE "ILLINI CERAMIST"

Plans for the revival of the annual "Illini Ceramist" have been announced by the Student Branch of the American Ceramic Society at the University of Illinois. As in the past,

the yearbook will carry photographs of seniors graduating from the Department of Ceramic Engineering, scenes from student activities, and familiar shots of the Ceramics building. A section devoted to alumni news is being planned. The 1950 yearbook will be placed on sale sometime in May at \$1.75 per copy, it was stated.

AHLMA TO EXHIBIT AT EEI SALES CONFERENCE, APRIL 4-6

The American Home Laundry Manufacturers Association will have display space at the annual sales conference of the Edison Electric Institute, April 4, 5 and 6, at the Edgewater Beach Hotel, Chicago, according to an announcement.

The sales conference will be attended by 300 to 1000 of the country's leading merchandisers in the electrical utility field, it was stated.

FASTENING CLINIC STRESSES REDUCING ASSEMBLY COSTS



At a fastening clinic held recently in Mansfield, Ohio, fifty-two engineering, drafting, tooling and cost-reduction personnel of Westinghouse Electric Corp. were told how efficient fastening methods can result in substantial reductions in the final cost of a

manufactured product.

The production men were told by Harold W. Kost, president of Prestole Corp., of a recent case where engineers had been successful in reducing the weight of a product by eleven pounds through more efficient fas-

tening methods. He stressed one method which he said completely eliminates the handling of separate fasteners.

BATTELLE INSTITUTE APPT.

Battelle Memorial Institute, Columbus, Ohio, has announced the appointment of Dr. Hamnett P. Munger to coordinate its air-pollution research activities and to act in a liaison capacity between Battelle and industry.

Dr. Munger, who has had 20 years of varied industrial and professional experience, joined the Battelle staff in 1948. He has a B.S. in chemical engineering from Georgia Institute of Technology, a M.A. in chemical engineering from Columbia University, and a Ph.D. in physical chemistry from the University of Pittsburgh.

VITRO PLANS EXPANSION OF NEW SUBSIDIARY

The Vitro Manufacturing Co. has reported it plans to expand the operations of its new wholly-owned subsidiary, Vitro Pigments, Inc., of Falls Creek, Pa.

Plans for the newly acquired firm, formerly known as Forche & Smith, call for the modernization of the present physical plant, which has 25,000 square feet of floor space, and the installation of new equipment for the production of other chemicals and pigments in addition to iron oxides now being made. Henry Forche, former partner, will be in charge of production, it was stated.

NATIONAL LEAD PRESIDENT TO ALLEGHENY LUDLUM BOARD

Allegheny Ludlum Steel Corporation has announced the election of Joseph A. Martino, president of National Lead Company, to the Allegheny Ludlum board of directors.

Martino began his career with National Lead in 1916, getting his education by attending night courses at Columbia University. Rising through the ranks, he was named vice presi-

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Using an infra-red system for degreasing

AT Lawson Manufacturing Co., Pittsburgh, a new method is in use for degreasing sheet metal parts for the floor furnaces which the company makes. All-metal electric radiant heaters have replaced the vapor method, and conveyorizing the operation has eliminated the excess handling involved.

Degreasing 31" x 20" sheet metal parts is now done at a fraction of the cost of the old method, according to a production report. A continuous conveyor now carries the parts without interruption through a space-saving infra-red oven that removes all trace of oil in 36 seconds. The

oven consists of two banks of nine vertically mounted 3.6 Kw radiant heaters, each bank with a heater at the base mounted on a 45° angle to increase the temperature on the bottom edge of the work. Total installed capacity is 72 Kw. The heated section of the oven is approximately three feet long. The conveyor moves at five feet per minute.

During the 36 seconds the parts move between the heater banks, the temperature rises and vaporizes the oil coating. Emerging from the oven, the parts proceed to the next operation. 160 parts can be handled per hour at an electrical energy cost of

one cent each, based on the plant's prevailing power rate. An economy factor is the oven's 2-minute heat-up time which permits the use of heat only as needed.

The oven's efficiency was increased by insulating the space behind the heaters with glass wool. Overhead, a hood was installed and a low volume fan removes exhaust from the building.

Reduced labor costs, greater efficiency, and more uniform degreasing are among the advantages Lawson lists for the radiant heater application.

Operator is shown hanging sheet metal parts for floor furnace on furnace conveyor which takes the ware on a 36-second trip through the infra-red oven.

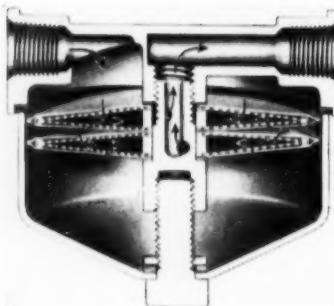


New Supplies and Equipment

C-40. Coating for ceramic surfaces

Glo-Dur is the name of a new series of industrial finishes developed and designed specifically to adhere tenaciously to glass and ceramic surfaces.

C-41. Effective filtering area with a minimum space



A new filter utilizes a number of design features to provide a large effective filtering area with a minimum space. One feature is a method by which a series of V-shaped horizontal filter discs are bolted into the cover of the filter housing, making it possible for easy removal for cleaning or replacement.

C-42. New coating designed for protective-maintenance

Specially designed to meet the stringent demands of myriad maintenance-coating and production-fin-

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form on this page.

ishing applications throughout the manufacturing, metal working, chemical processing and rubber industries, among others, for effective protection of exterior surfaces exposed to atmospheric and other corrosive conditions, a new rust-inhibitive, protective-coating compound is now available from a manufacturer of specialty finishing materials.

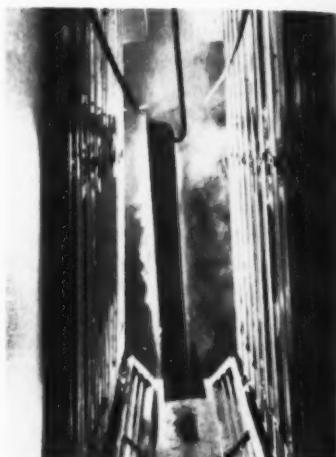
The new coating, applied by spray, dip or brush methods, is a fire-retardant film of uniform thickness and high hardness, yet of sufficient elasticity to cope with the coefficient of expansion brought about by temperature changes.

C-43. Large-capacity hydraulic materials handler

A large-capacity hydraulic materials handler for dumping liquids or solids into high level kettles or tanks has been developed. With this new handler, it is said to be possible for one man to empty a 500-pound capacity barrel, or a 55-gallon drum in less than a minute. No power other than water from the plant water main is required for operation. The unit is mounted on 6-inch rubber-tire cast-

ers, and can be used to serve a battery of tanks. Five-hundred pound barrels can be set into the handler by a standard two wheel truck. However, the lifter can also be fitted with a stainless steel trough and hopper into which dry or liquid products may be dumped and mixed before elevating.

C-44. Degreasing with infra-red



Space saving infra-red ovens that remove all trace of oil on sheet metal parts in less than one minute are now available. Grease is said to vaporize before the intense heat generated by the infra-red heaters. The ovens are available with continuous conveyors to eliminate excessive handling.

NEW LITERATURE

310. Data sheets on new process for electroplating on aluminum

A new chemical process which is said to eliminate many of the pitfalls encountered by manufacturers who do electroplating on aluminum has been announced. Some of the features of the process, known as "Alumetex," are: (a) One process for all regularly used alloys of aluminum; (b) Excellent corrosion resistance and adhesion by simple immersion treatments; (c) Complete elimination of blisters, pits, and dull deposits; and (d) Processes sand castings, die castings, and wrought alumin-

FINISH
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Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No. _____ No. _____ No. _____ No. _____

No. _____ No. _____ No. _____ No. _____

Name _____ Title _____

Company _____

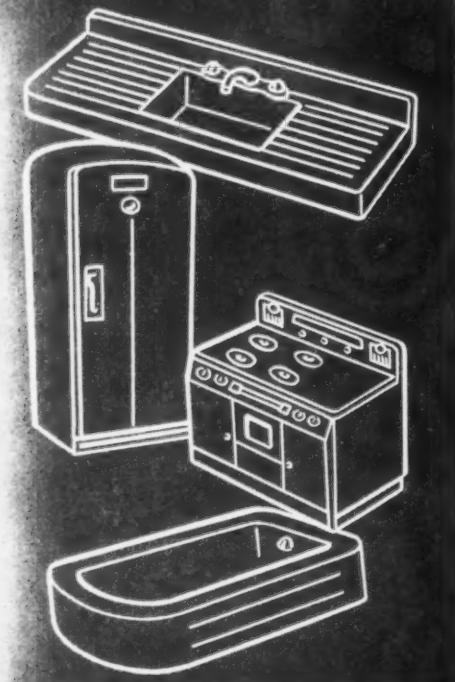
Company Address _____

City _____ Zone _____ State _____



Sodium Antimonate Gives You... 8 FINISHING TOUCHES

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- high degree of opacity
- high acid resistance
- improved lustre
- greater stability
- high strength
- maximum adhesion
- uniform high quality



Used either for regular and acid-resisting dry process cast iron enamels . . . or for antimony type sheet steel enamels, Metal & Thermit's Sodium Antimonate frit opacifier assures you of both beauty and durability in your finish. Manufacture is rigidly controlled for conformity of color in the frit and maximum opacity and lustre in the finished enameled ware.

NOTE: M & T Antimony Oxide is also *specially processed* for the manufacturers of sheet steel frits.

Call upon M & T — Headquarters for Opacifiers — for assistance. Our staff of ceramic experts and our Ceramic Service Laboratory are available to help you, whatever your problem. We welcome your inquiry.

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Ceramic



Division

120 Broadway

New York 5, N. Y.

Headquarters for Opacifiers

Tin Oxide
Antimony Oxide
Sodium Antimonate
Ultrox (Zirconium Opacifier)
Zircon

ium through the same cycle. The process has been production-tested for three years under various conditions at one of Detroit's largest job plating plants. Complete data sheets are available. The producer will plate samples upon request.

311. Compressor bulletin

A new 16-page fact-packed bulletin on "Unitair" compressors includes an easy-to-use selector chart plus de-

tailed section drawings and parts photographs illustrating economy and operating features.

312. Manual on pre-treatment of aluminum for spot welding

A 12-page manual on "Pre-treatment of Aluminum for Spot Welding" describes in detail and gives the reasons for and advantages of the outstanding characteristics of the process discussed. Many pictures, charts,

and graphs add to the completeness of the literature which contains interesting case-histories to support the claims for this process.

313. Pamphlet on metal for heat resisting applications

A pamphlet on "Rosslyn Metal for Heat Resisting Applications" contains information on how the metal may be employed in many heavy industrial applications where high heat transfer is required as well as hard corrosion resistant surfaces. It is a clad material consisting of a copper core, metallurgically bonded on both sides to stainless steel or Inconel. The metal is said to have higher thermal conductivity than any other commercially available heat resisting material.

314. "Everything in Safety"

The 1950 issue of "Everything in Safety" has just been released. The catalogue of personal protective equipment and industrial safety devices covers respiratory devices, eye protection, hats, gloves, carboy pumps, drum pumps and miscellaneous industrial safety equipment for use in industries. It contains 46 pages, fully illustrated, and includes a price list.

315. Bulletin on dust control in the ceramic industry

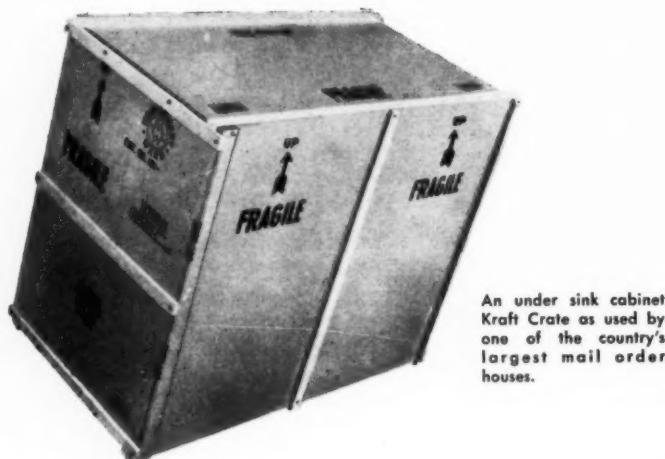
"The Use of Dustube Collectors in the Manufacture of Ceramics" is a new bulletin containing photos of various Dustube applications such as: the salvaging of enamel frit, the ventilation of enamel spray booths, and the control of dust in the manufacture of silica brick.

316. Folder on locknuts

A new 4-page illustrated folder contains information on a new line of bearing-positioning locknuts and lockwashers specially designed for effectively locking the various makes of ball and roller bearings in correct position on shafts of 5/16 to 7 11/16 inches diameter.

Full Coverage with B-G KRAFT CRATES

Where "full coverage" is required, our wood-cleated, corrugated Kraft Crate is ideal. Corrugated fibreboard reinforced with both vertical and horizontal wood cleats.



B-G Kraft Crates assemble quickly and easily. They are dust-proof, pilferage-proof, strong, rigid, and light weight. All faces may be printed—two colors if desired.

The B-G Cleated Kraft Crate combines the advantages of closed-type shipping containers with the strength and rigidity of all-wood slat crates.

OUR CRATES ARE BUILT TO PASS THE TESTS OF THE NATIONAL SAFE TRANSIT COMMITTEE

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NEWS → from Page 54

dent in 1944 after serving several years as controller. He was elected president in 1947. Martino is a member of the National Industrial Conference Board and also serves on the executive committee of the National Paint, Varnish and Lacquer Association.

TITANIUM METALS OFFICERS

Officers of the new Titanium Metals Corporation of America have been announced as follows: H. C. Wildner, president; Clark W. King, vice president; and A. H. Drewes, secretary-treasurer.

The company was organized jointly by National Lead Company and Allegheny Ludlum Steel Corp. to market and distribute titanium metals, its alloys and various related products.

ACS TO HOLD ANNUAL MEETING IN NEW YORK, APRIL 23-27

The 52nd Annual Meeting of the American Ceramic Society will be held in New York City at Hotel Statler, April 23-27, with room accommodations at the McAlpin, New Yorker, and Governor Clinton hotels.

The general outline of meeting of other years will be followed. The Ceramic Educational Council will meet Sunday morning, and the Institute of Ceramic Engineers and the Ceramic Camera Club in the afternoon. The Student Speaking Contest and the usual reception, with entertainment and refreshment, will be Sunday evening.

The general session will be held Monday morning, with C. E. Kenneth Mees, director of research, Eastman Kodak Co., delivering the Edward Orton, Jr. Fellow lecture. Also at this session will be the General Electric "House of Magic" demonstration. School dinners will be Monday evening, and the general entertainment program will also be that night.

Enamel Division meetings will be held on Monday afternoon, Tuesday and Wednesday.

The banquet will be Tuesday night at which time Hobart Kraner, of

Bethlehem Steel Corp., and ACS president, will give his report, and new Fellows and officers will be installed. Plant trips are being arranged in the New York area for Thursday.

Members of the General Committee include: R. L. Danielson, Metal & Thermit Corp., chairman; John H. Koenig and Robert B. Sosman, Rutgers University; G. H. Jeffrey, Titanium Alloy Mfg. Division, National Lead Co.; Irwin F. Zeiller, B. F. Drakenfeld & Co., Inc.; Robert A.

Barr, Carborundum Co.; and George C. Betz, Metal & Thermit Corp.

NEW PENSION PLAN AT YS&T

Shareholders of The Youngstown Sheet and Tube Company formally approved a pension plan for employees at a special meeting held Wednesday, February 15.

Of the 1,675,008 shares outstanding, 1,246,097 were voted in favor and 39,453 against the plan which

Robertshaw
SINGLE UNIT

time, temperature, motor
CONTROL FOR
LAUNDRY
DRYERS

- 1 Set temperature.
- 2 Push starting button to energize heater and motor.
- 3 When temperature is reached, heater is automatically disconnected and motor continues to run.
- 4 After cooling approximately 20°F., motor cuts off automatically.

In home and industry, EVERYTHING'S UNDER CONTROL

Robertshaw
THERMOSTAT DIVISION
ROBERTSHAW-FULTON CONTROLS COMPANY
YOUNGWOOD, PENNSYLVANIA

61

becomes effective March 1. Pensions also will be paid to employees who were required, because of age, to retire within 24 months prior to March 1, 1950.

1900 CORP. RAISES DIVIDEND

An increase in its quarterly dividend was announced February 16 by Nineteen Hundred Corp., St. Joseph, Mich., manufacturers of home laundry equipment. The company's board of directors voted to increase the quarterly dividend from \$0.25 to \$0.30.

AMERICAN STOVE SALES APPT.

L. L. Peters has been named manager of American Stove Company's commercial sales department, replacing William H. Frick who resigned, according to an announcement by Marc W. Pender, vice president in charge of sales.

Kenneth O. Dupree was named manager of the company's entire southeastern sales division to fill the

vacancy created when Peters received his new appointment.

DR. BAHNSEN DIES

Dr. Monroe John Bahnsen, director of chemical research, Ferro En-



amel Corporation, died February 4.

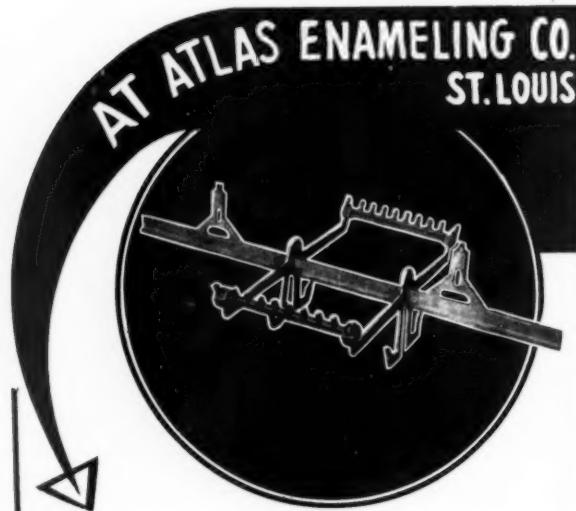
Dr. Bahnsen was graduated from the Case Institute of Technology in

1929 with a B.S. degree in chemical engineering. He was then employed at the Cleveland plant of Grasselli Chemical Co. until 1930 when he entered the Graduate School of Western Reserve University. In 1931, he was awarded the Cushman Fellowship for fundamental research in the field of porcelain enamel. He received the degree of Doctor of Philosophy in chemistry from Western Reserve in 1934, and had been associated with Ferro Enamel Corp. since that time. He was appointed director of chemical research in 1943.

He was a member of the American Chemical Society, American Ceramic Society, and the American Institute of Chemists. He was a registered professional engineer in Ohio.

The author of a number of papers and patents, he was active in the affairs of technical groups in which he held membership. He served as a councilor of the Cleveland Section of the American Chemical Society and as president of the Cleveland

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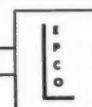


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Having Flanges Which Must Not Be
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Guaranteed Results
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Pickle Room
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Specification Materials
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Experienced Service

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Suppliers to Porcelain Enameling Plants
CLEANERS • NEUTRALIZERS
DRAWING COMPOUNDS

V. B. PUNDERSON COMPANY
402 SWETLAND BUILDING
CLEVELAND 15, OHIO

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how well do you know these people?

The major appliance and allied metal products field will manufacture and sell products valued in the *billions* of dollars during 1950.

As a producer of materials, equipment or components, or a service organization needed in this vast producing market, how well do you know these people?

As the only trade publication designed to serve this single field, **finish** knows its readers, works with them, and works for them.

Much of the best technical data and practical plant processing information presented is written by these **finish** readers, the men who oper-

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Professional Chapter of Alpha Chi Sigma.

A Memorial Fund has been established by contributions of friends and associates in memory of Dr. Bahnsen. This fund is to be used as an annual \$100.00 award to the senior student in the Department of Chemistry and Chemical Engineering at Case Institute of Technology, Cleveland, Ohio, who is selected as having done the most outstanding work in the

course in chemical engineering projects.

WEIRTON STEEL EXPANSION

Weirton Steel Company has awarded Koppers Company, Inc. a contract for the construction of a battery of 61 coke ovens, and alterations and extensions of its byproduct and benzol plants at its Weirton, W. Va., plant, according to a report. Work on the project will be completed by the end of this year, according to

Joseph Becker, vice president and general manager of Koppers' engineering and construction division.

TAPPAN STOVE PROMOTIONS

Announcement of three promotions at The Tappan Stove Company has



C. W. BONAR

been made by A. B. Ritzenthaler, vice president in charge of sales.

C. W. Bonar, formerly sales training director, was named to the newly-created post of manager of the LP-gas division. He will be responsible for developing sales in the expanding LP-gas field.

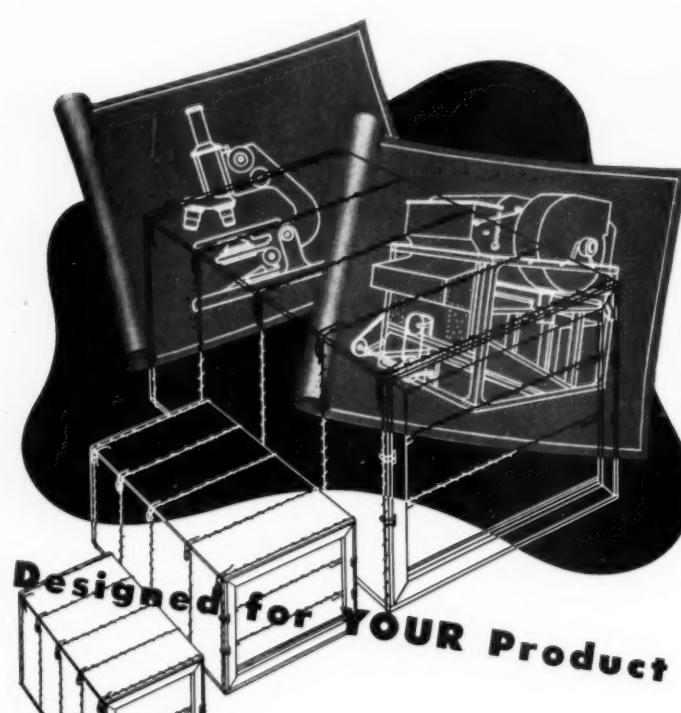
W. J. Daugherty, formerly assistant to the promotion manager, was named sales training director, and G. S. Condos, director of public relations, was assigned increased responsibility as assistant director of merchandising.

MAYTAG PLANT EXPANSION

It is reported that The Maytag Company is planning two additions to its plant in Newton, Iowa, at an estimated cost of \$600,000.

RECORD BOOKING SPACE FOR GAMA 1950 EXPOSITION

A new record for the number of gas appliance exhibitors registering and booking space in the first week for the 1950 Exposition of the Gas Appliance Manufacturers Association, to be held October 2-6, at Atlantic City, was announced February 16



SUPERSTRONG
SHIPPING CONTAINERS
REG. U.S. PAT. OFF.

WIREBOUND BOXES and CRATES
WOODEN BOXES and CRATES
CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS
PALLETS

The SUPERSTRONG box or crate for your product is on our designer's table.

SUPERSTRONG engineering and production "know-how" — based on nearly a century of experience — can create the type and size of shipping container that gives you greater overall economy through efficient construction, reduced space requirements, less shipping damage.

No obligation — just an opportunity to let us give you all details.

RATHBORNE, HAIR AND RIDGWAY COMPANY
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

by Harold Massey, assistant managing director of GAMA.

Massey said that "one hundred manufacturers of gas appliances and equipment have made reservations for space for the forthcoming Exposition during the past week. This is a new record in the history of the show which is held every two years in conjunction with the regular convention of the American Gas Association."

THOR CANADIAN EXPANSION

Fred M. McGovern, president, Thor-Canadian Co., Ltd., has disclosed plans for the construction of a new home laundry appliance plant containing 125,000 square feet of floor space on the outskirts of Toronto, Ontario. The present plant, containing 54,000 square feet of space, will be sold, it was stated.

The new plant of Thor-Canadian, wholly-owned subsidiary of Thor Corp., Chicago, will cost an estimated \$2 million dollars.

APPELLEURS D'APPOINTEMENT

The appointment of Henry K. Straw as product sales manager of Apex automatic home laundry equipment was announced by A. C. Scott, vice president in charge of sales, Apex Electrical Mfg. Co.

RHEEM ACQUIRES BOILER

BUSINESS OF WHEELING STEEL

Rheem Manufacturing Co. has purchased the boiler and tank business of Wheeling Steel Corp., at Portsmouth, Ohio, according to a report. The acquired business amounted to about \$3 1/2 million annually and will be transferred to other Rheem plants, it was stated.

JAMES NAMED PRESIDENT

OF ROBERTS & MANDER

Charles C. James has been elected president of Roberts and Manden Corp., Hatboro, Pa., by the board of directors to succeed Henry S. Minster who resigned. James, who is associated with Stevenson, Jordan and Harrison, Inc., management engi-

neers, has also been named treasurer, replacing W. A. Jaeger, who retired.

SERVEL UNVEils LINE OF AIR CONDITIONING EQUIPMENT

A new complete line of air conditioning equipment was unveiled by Servel, Inc., Evansville, Ind., recently at a two-day sales meeting held in the Edgewater Beach Hotel, Chicago.

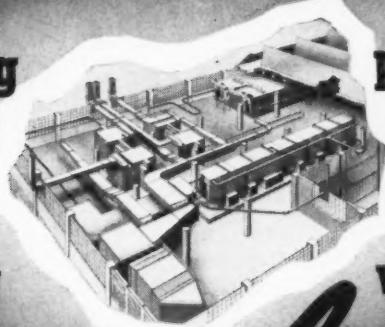
John Gilbreath, sales manager of Servel's air conditioning division.

said that, in addition to their all-year air conditioner, the line includes an absorption cooling unit to which may be added a steam generator, heating unit, humidifying and dehumidifying element, a fan filter unit, and control unit.

HOMMEL EXPANDS HOBBY DEPT.

The O. Hommel Company has just announced the expansion of their hobby department located at 211

**spray
painting**



**rust
proofing**

**flo-
coating**

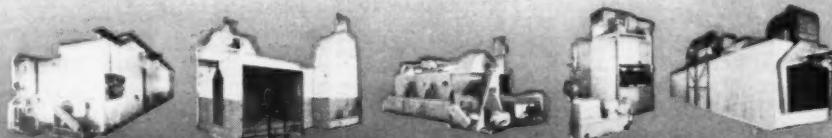
baking

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**Complete
finishing systems**

We specialize in EXPERIENCE . . . 31 years of building equipment for Production Finishes . . . assures the UTMOST in Design, Fabrication and Installation.

If YOU are interested in Low-Production Costs, Sales-Appeal Finish and Uninterrupted Production, feel free to call, wire or phone.



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PETERS-DALTON

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Inc.
HYDRO-WHEEL
CO.

Fourth Ave., Pittsburgh, Pa. Individuals will now find it easier to get their supplies in person or on a mail order basis. Professional materials used by potters are made up in smaller containers that are ideally suited to schools, students, young professionals and home ceramists.

In recent years, ceramics have become very popular in schools throughout the nation, and more and more people are enjoying this fascinating hobby.

TOLEDO PORCELAIN NAMES

SMITH, ADAMS TO TOP POSTS

Earle S. Smith, president and treasurer of Toledo Porcelain Enamel Products Co. since the firm was organized 21 years ago, has been elected to the newly-created post of chairman of the board.

Named to succeed Smith as president was Erwin L. Adams, vice president in charge of sales for the company since its organization. In his

new post, Adams will be operating head of the firm.

Leo Figmaka and S. F. Chappuis, both with the firm since its founding, were reelected vice president and secretary-treasurer respectively.

The company manufactures architectural parts for buildings and has a general jobbing business in porcelain enameled products.

REVEAL WASHER AND IRONER SALES FIGURES FOR 1949

Factory sales of standard-size household washers in 1949 totalled 3,033,106, according to industry-wide figures announced by the American Home Laundry Manufacturers Association. Washers sold in the four postwar years totalled 13,157,902.

Ironers sold in 1949 aggregated 307,345 units, and factory sales of dryers, now reported for the first time, were 105,727 units in 1949, said the AHLMA report.

FLORENCE STOVE NAMES CHIEF ENGINEER AT KANKAKEE

The appointment of George E. Small as chief engineer of the Flo-



when MEN buy, you can sell UP with FIBERGLAS* Insulation



It pays to remember that men swing the balance in an important percentage of range purchases. And insulation is one of the technical features they usually check. So we're doing a 3-way job to help you make easier sales of your quality lines made with Fiberglas Insulation.

1. A consumer advertising program telling men and women about the many uses and advantages of Fiberglas prod-

ucts. Ads in *Life*, *Saturday Evening Post*, and other magazines reach a total circulation over 20,000,000.

2. A dealer advertising program telling appliance salesmen how to sell to MEN and WOMEN—with Fiberglas Insulation.
3. A production program to give you the highest thermal efficiency in an insulation to best fit your assembly operation—Fiberglas!

OWENS-CORNING FIBERGLAS CORPORATION
DEPT. 109-C, TOLEDO 1, OHIO



APPLIANCE INSULATION

*FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.

FIBERGLAS IS IN YOUR LIFE... FOR GOOD!



ence Stove Company's Kankakee (Ill.) factory was announced recently by W. T. MacKay, vice president. He succeeds Herbert M. Reeves who was appointed director of product engineering for the entire Florence organization.

Previously, Small was chief engineer with a stove plant in Newark, Ohio, where he was responsible for engineering design, planning and de-

development of products, model making and testing. With Florence Stove he will head a department handling similar functions, it was stated.

LUBRICATION ENGINEERS

ANNUAL MEETING, APRIL 10-12

The 5th Annual Convention of the American Society of Lubrication Engineers will be held at Hotel Statler, Detroit, April 10, 11 and 12, it has been announced by W. F. Leonard, secretary-treasurer. The 3rd Annual Lubrication Exhibit will be held at the same time.

At one of the ten sessions, Dr. E. M. Kipp, of Aluminum Company of America, will discuss "Multi-Purpose Lubricants."

STANLEY LITTLE RETIRES FROM AMERICAN STOVE

Stanley E. Little, manager of the Lorain (Ohio) Division of American Stove Company, has retired, according to an announcement by Arthur Stockstrom, of St. Louis, president of the company. The assignment of responsibilities, formerly handled by Little, go to John M. Bayer and Carl Eversman, said Stockstrom.

A native of Lorain, Little joined the American Stove organization in 1907 as a timekeeper in the Lorain factory. Following a number of promotions, he was named vice president in charge of sales in 1930. Since October 1, 1949, he was in charge of production and sales at Lorain.

John M. Bayer, who will have charge of the Lorain Division sales program, started with the company in the press room of its Dangler factory, Cleveland, Ohio, in 1925. Following several promotions he became sales manager in 1945.

Carl Eversman, who has been Lorain personnel manager since early in 1945, has been named factory manager.

PALNUT COMPANY NAMES JOHNSON SALES MANAGER

The appointment of E. L. Johnson as sales manager of The Palnut Company, manufacturers of self-locking nuts, was announced recently. John-

son, who joined the company 8 years ago, formerly served in capacities of salesman and assistant sales manager.

HOMEFURNISHING MARKET DATES

Future homefurnishings market dates, as announced jointly by the American Furniture Mart and The Merchandise Mart, Chicago, are as follows: 1950, June 19-29; 1951, January 8-19 and June 18-28; 1952, January 7-18 and June 2-12; and

1953, January 5-16 and June 15-25.

TAPPAN SPRING PROMOTION

The largest and most spectacular spring promotion in the history of The Tappan Stove Company has been announced by Paul I. Berno, director of merchandising.

The campaign will have as its keynote a four-color, full-page advertisement faced by a black and white half-

to Page 78 →

The POSITIVE way to get "speck" free finishes

The positive way to eliminate all "black specks" resulting from iron contamination is to be sure your enameling plant is properly equipped with Frantz FerroFilter electromagnetic separators. Illustrated is the gravity FerroFilter for general use. The liquid is fed into the open bowl. Discharge of clean material is through a central opening at the bottom. Flow is accurately controlled to give uniform velocity through the magnetized grids.

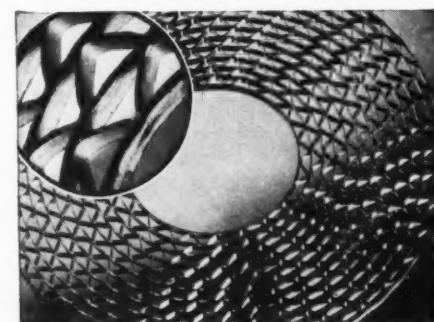
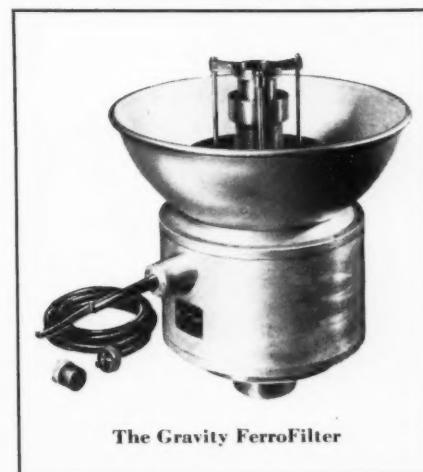
When used in combination with a suitable screening device, the finishing department is assured uniform, iron free slip — and — clean lustrous product finishes. You can reduce your rejects and be sure of "speck" free finishes by using Frantz FerroFilter for cleaning all the enamels you use.

Wet FerroFilters
Gravity-Pipeline-Underfeed
Dry FerroFilters
For dry process enamels and
other ceramic materials

Electromagnetic FerroFilters use from 16 to 30 of these patented grids in each unit, representing hundreds of feet of sharp, magnetized "collecting" edges.

FRANTZ FERROFILTER

(Reg. U.S. Pat. Off.)



Authorized Representatives for the Enameling Industry

Chicago Vitreous Enamel Product Co., 1425 So. 55th Court, Cicero 50, Ill.
Ferro Enamel Corporation, 4150 East 56th Street, Cleveland 5, Ohio

S. G. FRANTZ CO., INC.

161 GRAND STREET, NEW YORK 13, N. Y.

From the Editor's mail...

→ from Page 6

leasing any premature and unjustified information.

Hope you as an old friend will understand, as we are confident you will.

(name withheld)
we are confident our readers are not interested in rumors, but we will endeavor to print all authentic information as quickly as it becomes available.

publicity on better packing and handling will reduce loss and damage claims

Gentlemen:

I am certain that the campaign you are undertaking (*for the reduction of packaging and shipping losses on major appliances and allied metal products*) will be beneficial to shippers and carriers alike, as we know from experience that any publicity that results in better packaging on the shippers' part and an improvement

in the handling by the carriers will have the effect of reducing loss and damage claims, as well as the annoyance resulting therefrom.

Our Freight Claim people are constantly campaigning on this very subject, and the industry as a whole, I am sure, will be grateful for the effort you are putting forth.

R. L. Williams, President
Chicago and North Western
Railway System
Chicago, Illinois

congratulations for pioneering a badly needed publication

Dear Sirs:

Have been especially interested in the growth of *finish*. Certainly you are to be congratulated for pioneering a publication that was so badly needed. I am thinking specifically of the work in safe transit and packaging that is receiving well deserved recognition.

You may be interested to know that Mrs. Rollins read the issue featuring the Hotpoint range plant in its entire-

ty. I agreed with her that it was an outstanding piece of work, but still am amazed that such an article was written in such a manner as to be interesting to technical men and to housewives at the same time.

A. K. Rollins
The Maytag Company
Newton, Iowa

need name plate holder for use in furnaces

Gentlemen:

We are manufacturers of porcelain enamel name plates and we would like to know the name of a manufacturer of a suitable plate or screen to be used in the furnace for holding these small name plates.

The size of the plate we are now using is 24 in. x 36 in. and is a stainless steel plate. This is not satisfactory due to the warping from the heat of this material.

Carlton Rosenstein
Philadelphia Enameling Works
254 No. 13th Street
Philadelphia 7, Penn.

Bringing you...

Modern developments in plating processes and methods

Here are practical methods of making electrodeposits on more than 40 different metals, alloys and plastics. You get clear, simple explanations of the principles of electrochemistry and physics that underlie plating processes, and of recent developments in electrodeposition procedures and products.

PRINCIPLES of ELECTROPLATING AND ELECTROFORMING

By WILLIAM BLUM, Chemist, U. S. Bureau of Standards, and GEORGE B. HOGABOOM, Consultant

Revised 3rd edition, 455 pp., 6x9, 24 tables, illus., \$6.00

This book summarizes and digests the best of modern practice in the field. It covers methods used for qualitative, quantitative analyses of solutions; pickling, dipping; electropolishing; electroforming, electrotyping, etc. The metals are dealt with fully in the same order as in the periodic system of elements, making application of specific data direct and easy. You get full descriptions of deposition on metals and plastics, and of alloys including brass, bronze, tin-zinc, etc. Tables show resistivities of solutions, hardness of electro-deposited metals, and other electroplating engineering tables, data, etc.

FINISH, 360 N. Michigan Ave. Chicago 1, Ill.

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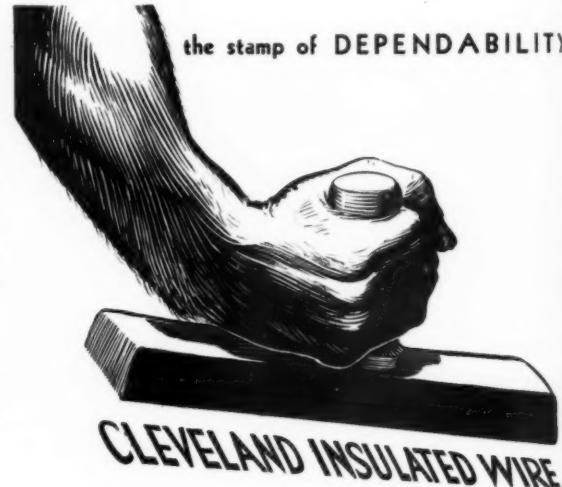
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the stamp of **DEPENDABILITY**



Cleveland Insulated Wire in the Linde-mann and Hoverson Electric Ranges insures this company, known 75 years for quality products, of the finest in dependability. As a specialist in range wires, Cleveland Insulated Wire is engineered to meet the problems and requirements of range manufacturers.

CLEVELAND INSULATED WIRE CO.

Asbestos covered wire and cable
Cleveland 13, Ohio

MARCH • 1950 finish

Range production—from raw material to the shipping dock

(Continued from Page 42)

hand booths are used for edge spraying. The work then moves to the dryer at 280 degrees F., edges being brushed on the conveyor while moving to the burner chain. This brushing and spray equipment is accommodated by complete exhaust equipment.

The flat ware, after finish coat, comes off the burning chain for inspection and into storage by ribbon conveyor and along this line it receives color grading.

Photoelectric "color" grading

This color grading station is equipped with photoelectric cells whose sensitivity is calibrated to a standard white panel. All ware is judged in relation to this color standard and the reflectance rating of the particular piece, moving on the ribbon conveyor, is thrown on an illuminated screen, the reflectance grading being marked on the particular piece as key in final matching. After reflectance check, the flatware moves by conveyor to storage to be banked for final assembly demands.

Very careful porcelain enameling controls are established in the department office in relation to quality graphs, load schedules, and defects. Errors are tabulated in relation to black specks, spraying defects, handling, ground coat, enamel—both by detect and piece.

Reversible ground coat line

The top, body or oven is placed on the second ground coat line and comes to spraying position whose 30' dimension accommodates from one to four sprayers. Spray booths have water wash exhaust equipment. All over-spray is reclaimed. The conveyor accommodating the ground coating can be run in either direction. Bodies can be sprayed to go directly into the dryer from one direction, or, when one piece oven linings are to be processed, the direction of the conveyor's travel can be reversed, and dipped linings emerge from the

dryer to be reinforced with ground coat in the same spray booth that was used for the bodies. The ware receives three passes at 150-250 degrees F. in the dryer, travels to a reinforcing booth where it is transferred to the burning chain, using the same T bar, but with different

hangars. These are basket hangers with drop rods for the bodies.

The ground coated top and oven ware moves through furnace into a storage area. A method of loading bodies to conveyor hangers by four point suspension is used. The bodies move on dollies of right height and are moved into position under the conveyor where the carrier, by an adept operator movement, is slipped under the front and rear top flange of the range body, a trigger catch at



PALNUT SELF-LOCKING NUTS

Speed Assembly-Cut Costs-

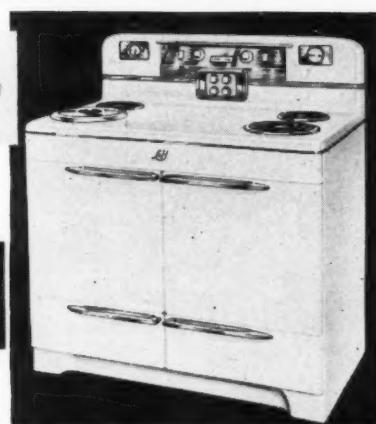
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Washer Type "E" PALNUTS simplify and speed up fastening of bushing-mounted multi-heat controls.



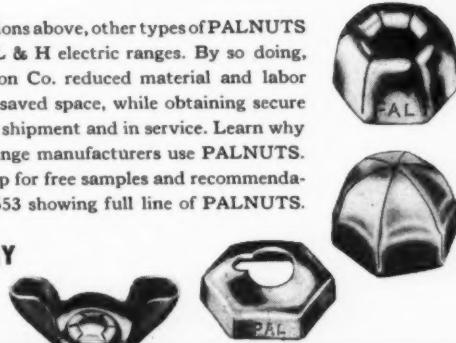
Typical group of Washer Type "D" PALNUTS holding sheet metal sections in rear of range.



• In addition to the applications above, other types of PALNUTS are used on the full line of L & H electric ranges. By so doing, J. A. Lindemann & Hoverson Co. reduced material and labor costs—cut assembly time—saved space, while obtaining secure fastenings that stay tight in shipment and in service. Learn why L & H and other leading range manufacturers use PALNUTS. Outline your fastening set-up for free samples and recommendation. Ask for Bulletin No. 553 showing full line of PALNUTS.

THE PALNUT COMPANY

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PALNUT
TRADEMARK
SELF-LOCKING NUTS

- Low in Cost
- Small space
- Vibration-proof
- Light weight
- Speedy assembly with hand or power drivers
- Many types for various needs

the rear flange securely holding the body in place. A single operator handles this load at the rate of 80 units/hour from the storage bank. The work flows by conveyor to four spray stations, receives two passes through the dryer at 100 degrees F., and comes to an exhausted brushing station, being "brushed on the fly" and is transferred to the burning chain. Following burning the ware is inspected and color graded as described for flat ware and then goes

to stock for final color matching.

Body and panels are matched, keyed by the reflectometer index into an "A, B, C" rating ranging from blue white to cream white. After this grading, body and its accompanying flat pieces are removed by transfer conveyor on the return trip of the 1700 ft. overhead line to the assembly department as schedules require.

All cover coats are acid resisting enamel with high gloss and applied

in a very thin coat. All porcelain enameling is being accomplished in one ground and one cover coat. Rework runs under 30 per cent and 2 per cent scrap is the maximum developed. Breakage on all items was under 1 per cent at my visit.

The 40' x 60' mill room has seven mills ranging from a 10 lb. sample mill to a 3,000 lb. production mill, all powered by overdrive. Storage of milled enamels is opposite the mills. The area is well drained. Mills are unloaded by compressed air. Very careful control is placed on specific gravity checks, pressures and cleanliness of pressure tanks.

All white booth scrap is reclaimed by remilling.

The company uses an interchangeable labor policy in which all workers can perform in ground coat dipping, spraying, finish coat operations of all natures. This produces high flexibility in the work force.

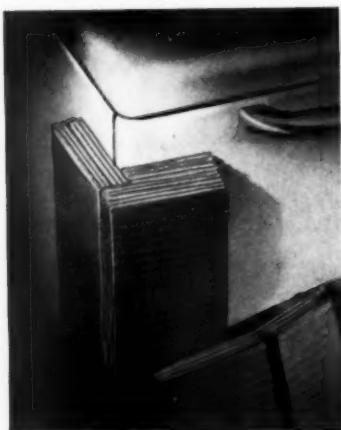
Organic finishing

Incoming shipments of organic finishing materials are tested for quality when received. Tests made include those for appearance - color, gloss and general finish, adhesion, resistance to heat, kerosene, hot fats, alkali, surface abrasion, salt spray, humidity, and weathering. In production, tests are again made to insure satisfactory results in these tests with particular emphasis on proper film thickness and adhesion.

Organic finishes are used on certain steel parts of L & H electric ranges, electric water heaters, and kerosene ranges, stoves and heaters. On the electric ranges some interior parts are coated with japan by dip. The top and outside shell of the electric water heaters are sprayed with synthetic white enamel, and the base is dipped in a rust-resisting primer and japan.

On oil ranges, exterior parts are sprayed with synthetic white enamel. Some interior parts are dipped in japan and others in heat-resisting aluminum finish.

The tops of small table oil stoves are coated with japan, the body dipped in synthetic white enamel and the burners in heat and oil-resisting



"BILD-UP" Protectors

As Used by Lindemann & Hoverson for Packing
Electric Ranges

A Complete Paper Pack that Does the Job Right

- "Bild-Up" Protectors are Made of Corrugated Board to Give Cushioning Protection.
- Can be Manufactured in Any Style to Fit your Specific Need.
- Ready to Use — Speeds Packing.
- Packaging Design Consultation is One of Our Public Services.

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OMEROY MANUFACTURING CO.

Vincennes, Indiana

lacquer. On space heaters, outside surfaces are sprayed in a brown metal-lescent finish and the interior in heat-resisting aluminum.

At L&H, some silk screen printing is done on painted surfaces, also some lettering on bright electroplated parts by the fill-in process.

Considerable peelable plastic coating is used for the protection of bright metal surfaces in handling and forming operations.

An item of care from the safety standpoint is shown in the mirrors on company streets angled for right angle vision.

Power tools used on 18 station assembly line

The assembly transfer comes to a rubber bumpered dolly beside the final assembly conveyor station where, in another deft movement, a worker transfers it to shipping crate bottom upon which it moves along the 400 ft. final assembly line. All tools along this line are power driven. Essential subassemblies are at right angles to the line. The line is accommodated by electrical and air service connections.

Some 18 stations are involved in final assembly on this line and the electric range then comes to circuit and wattage testing, including breakdown for electrical ground.

Then the electric range, as the final aspect of assembly, enters a brilliantly lighted final inspection tunnel which includes four banks of fluorescent lighting parallel on each side. Each range detail is given 100 per cent inspection. The work rides on its crate bottom with two resilient pads. As it comes from this tunnel a turntable in the roller conveyor line permits those units failing to pass inspection to be shunted to repair. These come back through the same electrical test and inspection procedure.

Floating pack used for shipping

The method of crating is as good as any observed. Kimpak padding is placed between panels and the panels are tape closed, as are also all buttons, controls and switches. Cardboard spacers between panels are taped.

Broiler pan, drip trays, rack, in-finish

dividually wrapped, are packaged and cartoned with oven racks in one container. These and the "duo-cook" cooker are nested in an egg crate type container and are bundled into the range top.

Thick, corrugated pad laminations are placed on four sides and top of range. The side and top crating panels are nailed up so that, really, the range is floating in its crate.

This crated range receives two shipping tests. One simulates the

vibrations that would be received during a 2,000 mile freight travel. The second is an impact test, developed on an incline which is zoned to the miles per hour of freight train make up, and capable of testing the impact that would be received in switching and bumping. This impact test is applied to all six faces of the crate. Tests are conducted in accordance with the National Safe Transit Committee recommendations.



are strong, safe, dirt-proof — light in weight — comply fully with railroad requirements — present a clean, attractive exterior that lends itself well to advertising your product.

Cornell Cleated Fibre Cases are made at the Hummel & Downing Division at Milwaukee in many styles and sizes. We invite your inquiries for Cleated Corrugated or Cleated Solid Fibre Cases.

Cornell wood products co.
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MILWAUKEE 1, WISCONSIN

Cancer's danger signals

1. Any sore that does not heal
2. A lump or thickening in the breast or elsewhere
3. Unusual bleeding or discharge
4. Any change in a wart or mole
5. Persistent indigestion or difficulty in swallowing
6. Persistent hoarseness or cough
7. Any change in normal bowel habits

can be your
safety signals

Cancer is curable if discovered early and treated properly

If any of these symptoms appear, see your doctor *at once*.

Write for the booklet about cancer. Just address your request to "CANCER".

AMERICAN CANCER SOCIETY, INC.



MARCH • 1950 finish

Electrical measurements on metal protective paints

(Continued from Page 29)

Another circuit which has been used for direct current measurement of paint film resistance is shown in Figure 5. This circuit utilizes a condenser to store the current. In using this circuit, an open circuit potential (E) of the cell is measured with a vacuum tube potentiometer. Then, a condenser selected to limit the amount of current is connected across the cell and charged from the cell. After a suitable length of time, the charge is discharged through a ballistic galvanometer and its magnitude determined. With this information, a value indicative of a resistance can be calculated. The objections to the previous type of pseudo-resistance measurement are also applicable. Figure 6 shows resistance values obtained on two widely different paint films by these techniques.

It is the general practice when measuring solution conductivity in physical chemistry to use an alternating current and a bridge circuit for the measurement. This can be applied to measurement of painted steel resistance, and is believed preferable. The circuit and the measurement, however, are not always simple. In the initial measurement, the painted steel behaves much like a condenser with a relatively low dissipation factor. With time, the dissipation factor may become greater than 0.50 and necessitate a change to a slightly different measuring technique. The circuit used for this type of measurement is illustrated in Figure 7. Some data that has been obtained is shown in Figure 8. It may be interesting at this point to present a conception of how an electrical analog of a painted steel surface appears when measured by alternating current. Figure 9 shows this.

Dr. F. W. Wormwell and Miss D. M. Brasher⁽⁵⁾ have followed corrosion by means of the capacitance shown and their results have been indicated in Figure 10. The interpretation of what occurs to cause this shift in capacitance is cloudy at the moment but several possibilities can be mentioned. Inasmuch as the

simple formula for a capacitance is

$$C = \frac{KA}{d} \quad (0.224)$$

C = Capacitance μ ufd

K = Dielectric constant

A = Area sq. in.

d = Thickness of dielectric in. An increase in capacitance may be occasioned by:

(1) An increase in dielectric constant of the polarizing film.

(2) An increase in area of the polarizing film.

(3) A decrease in thickness of the dielectric separating the metal plate and the hypothetical solution plate of the condenser.

Wormwell and Brasher's⁽⁵⁾ work can be drawn on for a concluding and summarizing illustration. Figure 11 shows the relation of potential, resistance, and capacitance with "area rusted" on painted steel panels they have examined. Resistance is A.C. resistance at 1000 cycles and capacitance is also measured at 1000 cycles. "Area rusted" was observed visually. The work does show that A.C. resistance and capacitance exhibit a remarkably good dependence on corrosion onset and extent.

NESA holds annual convention and equipment exhibit in Cincinnati

(Continued from Page 45)

Jake C. Allen, Southern Neon Displays, Atlanta, Ga.; Vice President, Ludwig Trinajstich, Luminart Neon Company, Los Angeles; and Secretary-Treasurer, Harry H. Brown, Federal Enterprises, Inc., Chicago.

In addition, the following directors were elected: William E. Blommel, Blommel Sign Co., Dayton; Leland Norling, Zeiser Brothers, St. Louis; J. C. Zimmerman, J. F. Zimmerman & Sons, Dallas; Harry F. Belsinger, Belsinger Sign Works, Baltimore; B. J. Schneider, Philadelphia Sign Co., Philadelphia; Ryland H. Walford, Walford Electric Company, Missoula, Montana; John R. Ford, Jefferson Electric Co., Bellwood, Illinois; and Edward R. Samuels, Tube Light Engineering Co., New York City.

Time potential studies, when properly interpreted, do much to elucidate the manner and mechanism whereby a metal is protected. They can show when an accelerated corrosion commences.

Resistance measurements, if made by means of direct current, are unreliable. The two methods discussed in the paper more probably indicate activity than they do resistance. Resistance measured by alternating current of relative high frequency show at least the moisture penetration and may reflect interfacial conditions after moisture penetration.

The meaning of capacitance measurement is cloudy. Work performed by Wormwell and Brasher shows a relation between corrosion and capacitance.

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- (2) Burns, R. M., Schuh, A. E., "Protective Coatings for Metals", A.C.S. Monograph 79, p. 308, New York, Reinhold Publishing Corporation, (1939).
- (3) Gaty, O., Spooner, E. C. R., "The Electrode Potential Behavior of Corroding Metals in Aqueous Solutions", Oxford Clarendon Press, (1938).
- (4) Mears, R. B., "A Unified Mechanism of Passivity and Inhibition", *Journal Electrochemical Society*, Vol. 95, No. 1, p. 1, (1949).
- (5) Wormwell, F. W., Brasher, D. M., "Electrical Properties of Paint Films on Metals", *Nature*, Vol. 159, p. 678, May 17, 1947.
- (6) Zahn, H. E., "Laboratory Evaluation of Corrosion Resistant Pigments and Vehicles", *Paint, Oil & Chem. Review*, Sept. 5, 1946.

In referring to the 1950 sign meeting, Jake C. Allen, Association president, stated: "It is gratifying that each year there is an increasing desire on the part of the members of the Association to obtain more information on ways and means to improve their plant operations and service. Therefore, the NESA intends to devote a great deal more time at the next annual meeting to clinical sessions covering various phases of operating on electric sign business."

Announce 1951 convention dates

The NESA Board of Directors voted to hold the next convention February 5, 6 and 7, 1951, at Hotel New Yorker in New York City, providing satisfactory arrangements can be worked out.

Packaging for export—another lesson in appliance protection

(Continued from Page 22)

lumber is specified. These groups include the Southern and Western pines, spruce, and poplar.

An average 9 cubic foot capacity refrigerator weighs approximately 360 lbs. net, depending on the particular model. When packed and crated for export, the gross weight is around 500 lbs. The outside dimensions of the export crates for our current 9 cubic foot models are 36" wide by 64" high by 30 $\frac{3}{4}$ " deep (front to back dimensions). The total cubic footage is 41.37. If a solid wood case were needed, there would be a considerable increase in both weight and over-all dimensions.

Importance of proper nailing and banding

A vital factor in the overall construction of a shipping crate is proper nailing. The size and type of nails and spacing must be adequate to assure that the full strength potential provided in the design and materials specified will be realized when the crate is nailed together in the final assembly. A detailed nailing diagram showing the number, size, and kind, and exact location of every nail to be driven should be a part of every set of crating specifications.

Proper banding of an export crate, or container, adds greatly to the total strength of the complete pack.

We employ $\frac{3}{4}$ x .023 perforated steel strapping for banding our export refrigerator crates. The perforated strapping enables the banding to be readily nailed after it has been tensioned, and the seals crimped. This provides a more secure method of fastening than does the use of staples. Three bands are used. The crate is banded completely around the top, the bottom, and around the lower of the intermediate horizontal cleats.

In the design of any export shipping container, provision should be made in the construction of the crate to permit easy handling by the various types of power trucks, as well as by ordinary hand trucks.

The construction of the base of the

container should be such as to lend itself readily to the entry of the forks of power trucks and sufficient clearance. Generally, at least $\frac{7}{8}$ " should be allowed so that easy entry and withdrawal of the forks is possible. In the arrangement of the cleat members, consideration should be given as to whether the container should be trucked from the front, or back, or sides, and the skid cleats positioned accordingly.

The full-floating method

For products where even a very small degree of torsion would cause damage, a full floating method of packing may be necessary. In such cases the product is securely mounted on a separate base, which is independent of the crate.

In establishing clearances, provision should be made for sufficient lateral movement within the exterior crate to allow considerable shift before the separate mounting base is stopped by the sides of the crate. To limit the movement under vertical impact, blocking cleats are needed along the inner side of the panels of the crate.

When corner cushioning pads are used in a full floating pack, it is generally desirable to fasten these directly to the corners of the product, rather than allow them to be loose, or to secure them to the inside of the exterior crate. The use of corrugated pads or pads of a more resilient material, between the separate mounting base and the bottom of the crate, will afford a cushion against vertical impact.

The matter of moisture-proofing to prevent corrosion is, fortunately, one that does not concern us in our export packing. The products of our Division are all designed to deal in moisture and are thoroughly tested under very extreme conditions of moisture and temperature.

Moisture, vapor barrier wrapping materials

The prevention of corrosion is, however, a grave concern in the case

of many products, and presents a real problem in export packing of these. There are many materials and methods available. A choice must be made that will furnish complete protection to the product and yet not be too expensive in application. In addition to the numerous types of moisture, vapor barrier wrapping materials, there have recently been developed several vapor phase inhibitor papers. These are impregnated papers which emit a gas that neutralizes the effect of moisture. A number of successful experiments with this manner of rust prevention have been made by some of the largest exporters in the shipping of bare metal stampings and other unfinished metal parts. Formerly, it had been necessary to coat these by spraying and dipping, using a petroleum or lanolin base material. This is a pretty costly operation, and the removal of this coating in the foreign assembly plant is also expensive.

To assist in determining the adequacy of proposed packing specifications to protect the product in shipment, pre-shipping tests may be used.

The importance of pre-shipping tests

There are two principal tests to which we subject both our domestic and export shipping containers. These are the Conbur incline impact test and the vibration test. It is essential that the tests should reproduce, as nearly as possible, actual conditions of handling in domestic and export transit, and should be sufficiently rigorous to indicate the weak points or failures of either the product or the container.

We cannot over-emphasize the value of these pre-shipping tests. While the results of such tests must not be considered conclusive, they do afford an excellent indication of whether product and container will be able to stand the gaff under actual conditions of domestic and export transit.

We have used the Conbur incline impact tester since the inception of the Refrigerator Division several years before the war. This test has proved invaluable to us in eliminating weak points in design or material

Lightweight Inconel burning
tool designed and fabricated
by STROHECKER, INC., Enon
Valley, Pennsylvania.

How much of your furnace load is **DEAD** load?

What percentage of your fuel bill is wasted
in heating excess tool weight?

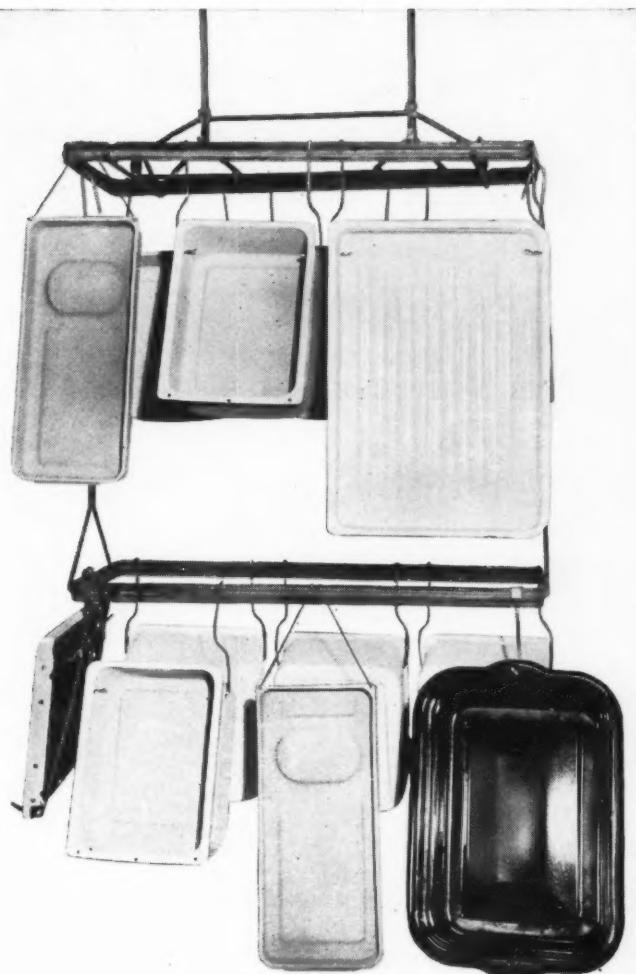
And how much does it cost to maintain
this fixture load...in repairs, replacements,
wire-brushing?

The answer is, *plenty*...if your burning
tools are needlessly heavy, and needlessly
heat-vulnerable.

Here is how one large enameling concern
solved this problem...and how *you* can, too.

After studying the excellent performance
record of Inconel in high-heat applications,
they installed burning tools fabricated of
wrought Inconel®. They reported these
remarkable economies:

1. 35% to 50% saving in tool weight, per-
mitting increased furnace loading.
2. Substantial reduction in fuel costs.
3. Maintenance cut. Fixtures were in con-
tinuous service for 8 months before
cleaning was required.



4. No damaged finishes caused by spalling of the tools.

In a competitive market, savings like these
show up big on the balance sheet!

Take the first step toward increased fur-
nace efficiency today...by writing to the
fabricator of these lightweight burning tools,
Strohecker Incorporated, Enon Valley,
Pennsylvania. Ask him to show you how
heat-resisting, anti-spalling Inconel fixtures
actually cost less on a price-to-service basis.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.



INCONEL ... for long life at high temperatures

of the product and of the shipping container. Three years ago, we installed one of the vibration package testing machines, and this type of test has become standard with us since that time.

We were quite interested to learn that both of these test procedures are incorporated in the plans of the National Safe Transit Program, and I am sure that the full implementation of this program will certainly result in a continued reduction of shipping damage to the products of this industry.

We have set the fifth zone impact as being the export standard for our Conbur tests. In order to have a good safety factor, each face, as well as the base of the crate, is subjected to two such impacts, a total of ten. At the completion of this cycle, the product is uncrated and unpacked and carefully examined to determine whether any damage or failure has resulted. If a weak point has been indicated, a revision of the original packing design, or of the product, is made and further tests conducted to determine if this has been overcome.

The vibration tests are performed on the vibration testing machine and the standards we have set here provide for a two-hour run at 180 R.P.M.'s. We have found that frequently points of failure not indicated in the impact tests have occurred under the accelerated vibration, which simulates the actual conditions to be encountered in freight car movement.

Field reports received from overseas service engineers

The actual experience in shipment is, in the last analysis, the conclusive test as to whether the export crate or container is really adequate. Reports are solicited from our export distributors and the various overseas field service engineers, as to the condition of shipments upon arrival. These reports coming from representative destinations throughout the world provide one of the most effective means of maintaining control over the handling of the product in shipments. Wherever such reports have indicated that failures have occurred, a careful study is made in an endeavor to

ascertain the nature and cause of such damage so that immediate provision can be made to prevent recurrence.

All have a vital interest in safe delivery of products

We all have a very vital interest in delivering the products of our American industry to the ultimate consumer in every part of the globe in as nearly a perfect condition as is possible.

The manufacturer's stake in packing for safe shipment

Packing for Safe Shipment is the concern of the manufacturer, the shipper, the domestic carriers, the steamship companies, and the underwriters. It is our own feeling that the stake of the manufacturer is as great, or greater, than that of any of the other groups concerned. He has used all the resources of his engineering and product design department, and his productive equipment facilities and personnel, to create and produce a product for his sales group to market, and has, therefore, the most compelling interest in seeing that product arrive at final destination in an undamaged condition.

To attain this goal requires the closest kind of earnest and continuous

cooperation on the part of the manufacturer and shipper, and all those engaged in the domestic and foreign transportation of the products of our industry.

Damage to products in transit is pure economic waste, and represents a headache to all concerned. The loss involved, and the expense incurred to repair the damage, or make replacements, is always magnified greatly in the case of overseas deliveries.

Large rewards in goodwill and dollars for all

If the packing engineer will strive constantly to develop packaging specifications that embody the best of his experience in providing adequate protection under all normal conditions of handling in domestic and export transit, he will not be far from his goal, and he may then reasonably expect, and will assuredly receive, the loyal cooperation of the transportation agencies, in a combined damage and claim prevention effort that will bring large rewards in goodwill and dollars saved for all.

Some of the data used in this article was used in the "Packing for Safe Shipment" course at New York University.

The significance of water in industrial processes

(Continued from Page 25)

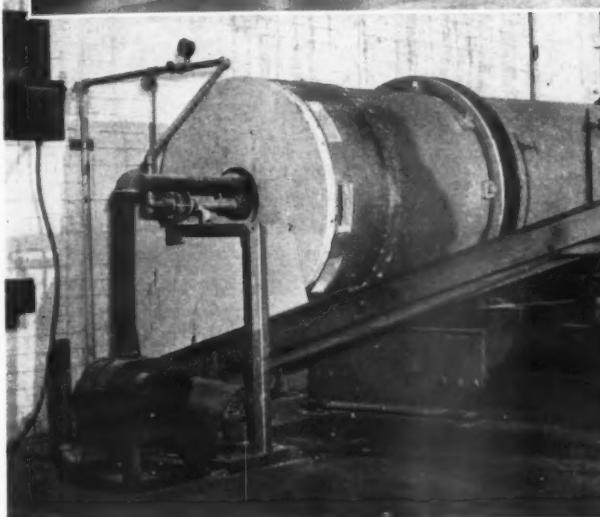
centimeters of violent electrolytes (the same as found in raw water supplies) and mixed. It was then found that the entire batch would run almost like water. When a water supply varies 5 gpg in total solids there will be a variation of over an ounce of electrolytes in 100 gallons. Obviously such variation will have a great effect on the properties of the enamel. In another instance, a well known company found that to obtain the desired results with a certain enamel in Wisconsin, it was necessary to add calcium nitrate to the mill. When this same adjustment was tried in a plant in Michigan the entire batch became like thick mud. If these plants were using deionized water,

the same corrective measures would have applied in both plants.

In review, water is one of the principal materials used in a porcelain enameling plant. Ion exchange offers distinct advantages to the porcelain enameler: first, for the softening of water for the cleaning room where the consumption of cleaner may be decreased and cleaning efficiency increased materially; second, for the deionization of water for the mill room to assure the enameler that his water supply will be pure and unchanging, enabling him to obtain greater uniformity of results and product.

Adapted for *Finish* from paper presented before the Midwest Enameler's Club.

MADE RIGHT to WORK RIGHT



MADE right to Work right — that's the story behind every bag of Century time-proved frit that is released for shipment to a customer.

Made right — because only tested raw materials are used, the plant equipment is of modern proved design and construction, and the men who control the production have had the years of experience required to produce consistently good enamels.

But that's not all — laboratory control of production and the finished product is constantly maintained and, most important of all, when you buy Century frit you

know that every enamel, regardless of type, has been plant-tested in production enameling plants before it is offered for sale.

Be sure with Century in 1950. Send for a trial run now and check these statements in your plant.

**FRIT from
CENTURY**
FRIT  **MASTERS**

A complete field service now available
to all Century frit customers

CENTURY VITREOUS ENAMEL COMPANY, 6641-61 S. Narragansett Ave., Chicago 38, Ill.

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McDANIEL REFRactory PORCELAIN COMPANY.....	79
METAL & THERMIT CORPORATION	59
MICHIGAN STEEL CASTING CO.	00
NEW MONARCH MACHINE & STAMPING CO.	4
NORTHWEST CHEMICAL COMPANY	14
NORTON COMPANY	00
OREFRACTION, INC.	00
OWENS-CORNING FIBERGLAS CORPORATION	66
PALNUT COMPANY, THE	69
PEMCO CORPORATION	12 & 13
PETERS-DALTON, INC.	65
PENNSYLVANIA SALT MANUFACTURING COMPANY	43
POMEROY MANUFACTURING COMPANY	70
PUNDERSON COMPANY, V. B.	62
RATHBORNE, HAIR AND RIDGWAY COMPANY	64
ROBERTSHAW-FULTON CONTROLS COMPANY	61
ROTOPRAY MANUFACTURING COMPANY	00
SHERWIN-WILLIAMS CO., THE	48
SIGNODE STEEL STRAPPING CO.	00
SPARKLER MANUFACTURING CO.	00
SUPERIOR SHEET STEEL	5
TINNERMAN PRODUCTS, INC.	16
TITANIUM ALLOY MFG. DIV., NATIONAL LEAD COMPANY..	31
TITANIUM PIGMENT CORPORATION	11
TUTTLE & KIFT, INC.	32
UNION STEEL PRODUCTS COMPANY	00
UNITED STATES STEEL CORPORATION	15
VITREOUS STEEL PRODUCTS CO.	7
WEYERHAEUSER SALES COMPANY	00
WIREBOUND BOX MANUFACTURERS ASSN.	6

"I saw your ad in finish"

NEWS → from Page 67

page in the March issue of "Better Homes and Gardens." This advertisement sets the theme around which the complete campaign is built. Other advertisements will appear in 10 other national magazines, it was said.

NATIONAL PACKAGING WEEK SET FOR APRIL 24-27

The relationship of materials, manufacturing process, handling, and labor costs in reducing the overall costs were mentioned by the Planning Council of the Packaging Division of the American Management Association as the focal points of interest in the multi-million-dollar-a-year American packaging, packing and shipping business.

The views of the Council, whose 18 members represent buyers and users of packaging machinery, materials, design and services, was made known following a meeting of the Council. At the meeting preliminary plans were made for the annual Conference on Packaging, Packing and Shipping to be held concurrent with AMA's 19th National Packaging Exposition, at Navy Pier, Chicago, April 24-27.

According to J. D. Malcolmson, AMA packaging vice president and technical advisor for Robert Gair Company, Inc., New York, the AMA Packaging Planning Council reported attempts to lower production costs and increase sales through consideration of the following which are receiving the most attention throughout industry:

Use of low cost materials which may involve higher labor costs and vice versa.

Performance testing to determine specifications more accurately.

Possibilities of improving railroad car loading and bracing.

Increased point-of-sale appeal.

"Fatigue" effect of warehousing practices on containers.

Improved interior packing to reduce damage in transit.

Altering container design to fit handling requirements.

The economic potential of pre-



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Finish March • 1950

packing and pre-packaging of other items in addition to food.

Possibility of reducing shipping costs by increased use of trucks, and

Increased mechanization in package manufacture.

Other subjects of interest listed were Vapor Phase Inhibitors, packing for parcel post shipment, and standardization of shipping methods.

The agenda for the conference, which will be completed in several weeks, is being prepared under the supervision of the Council. Members include:

W. Gordon Bennett, manager, packing and paper, standards department, Anaconda Copper Mining Company, New York; Dr. F. C. Campins, president, Polymer Industries, Inc., Astoria, New York; R. de S. Couch, head, packaging research, General Foods Corporation, Hoboken, New Jersey; Lee F. Forker, general purchasing agent, Quaker State Oil Refining Corporation, Oil City, Pennsylvania; Henry J. Howlett, president, Container Laboratories, Inc., New York.

W. R. Hummel, methods supervisor, Western Electric Company, Kearny, New Jersey; O. E. Johnson, director, industrial engineering, Kaiser-Frazer Corporation, Willow Run, Michigan; Douglas Kirk, mechanical research department, The Quaker Oats Company, Akron; Richard

W. Lahey, packaging and materials handling, American Cyanamid Company, New York; L. W. Ledbetter, general purchasing agent, Ralston Purina Company, St. Louis; S. W. MacKenzie, director of purchases, United States Rubber Company, New York.

Glenn Mather, paper converting division, Continental Can Company, Inc., New York; R. C. Reed, secretary, package com-

mittee, The Texas Company, New York; D. E. Rueckert, general superintendent's office, Swift & Company, Chicago; Paul Vogt, package engineer, General Electric Company, Schenectady, New York; John A. Warren, packaging consultant, American Home Products Corporation, New York; R. F. Weber, manufacturing research department, International Harvester Company, Chicago.

SAFE TRANSIT COMMITTEE CERTIFIES ADDITIONAL MANUFACTURERS AND LABORATORIES

The following companies whose packaged products are being tested under the National Safe Transit Program Testing Procedure have been added to the list of certified manufacturers as published in *finish* (Page 44, January 1950). These companies are authorized to use the distinctive Safe Transit Labels:

Chambers Corporation, Shelbyville, Indiana.

Federal Enameling & Stamping Company, Pittsburgh, Pennsylvania.

The Fletcher Enamel Company, Dunbar, West Virginia.

General Electric Company, Erie,

Pennsylvania.

Hardwick Stove Company, Cleveland, Tennessee.

Hotpoint, Inc., Chicago, Illinois.

The following testing laboratories have been added to the list (Page 80, January 1950 *finish*) of laboratories certified by the National Safe Transit Committee:

Cozier Container Corp., 446 East 131st Street, Cleveland, Ohio.

Inland Container Corp., 700 West Morris Street, Indianapolis, Ind.

U.S. Testing Co., Inc., 1415 Park Avenue, Hoboken, New Jersey.

INDUSTRIAL ENGINEERS MERIT AWARD TO BRIGGS



The American Society of Industrial Engineers presented their 1950 Merit Award to officials of Briggs Manufacturing Co. during a special television program January 20, in Detroit.

The citation, given for excellence in design, engineering and manufacture of bathroom fixtures, was presented to Briggs' plumbing ware division.

In the photo, left to right, are the following Briggs executives: E. O. Brady, general manager, plumbing ware division; W. D. Robinson, president; and, extreme right, W. L. Morris, sales director. Robert L. Crinnan, shown holding the plaque, national president of ASIE, made the presentation in behalf of the Society's board of governors.

REGENSBURGER HEADS LINK-BELT GENERAL ENGINEERING DEPT.

Link-Belt Company has announced that H. Walter Regensburger has been appointed chief engineer of its general engineering department to succeed Harry L. Strube, who retired. The department has been transferred from Philadelphia to Chicago.

Assisting Regensburger, will be Charles M. Young, Jr., in the capacity of chief standards engineer. Both men have been associated with the department since it was first organized in Philadelphia in 1946, and both were previously members of the Philadelphia plant engineering department.